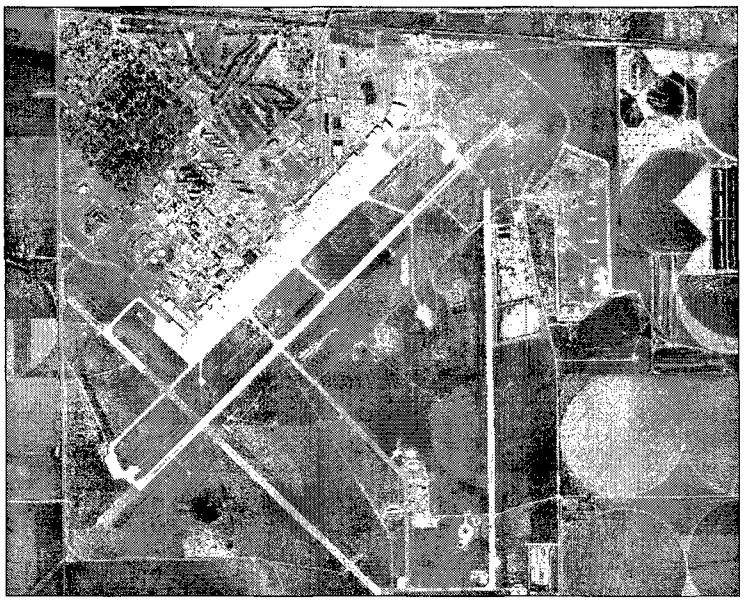
CANNON AIR FORCE BASE
NEW MEXICO

INSTALLATION OF A
DIGITAL AIRPORT SURVEILLANCE RADAR



FINAL ENVIRONMENTAL ASSESSMENT

Prepared by:

METCALF & EDDY | AECOM

for:

Hanscom AFB, Massachusetts

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Cannon Air Force Base, New Mexico

Hanscom Air Force Base, Massachusetts

Medcalf and Eddy, Massachusetts

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ESC/GAA
75 Vandenberg Dr
Hanscom AFB MA 01731-2103

27 CES/CEVN
506 N DL Ingram Blvd
Cannon AFB NM 88103-5003

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NA

9. SPONSORING / MONITORING AGENCY NAME(S) AND ADDRESS(ES)

ESC/GAA
75 Vandenberg Dr
Hanscom AFB MA 01731-2103

27th Civil Engineer Sq
Environmental Flight
506 N DL Ingram Blvd
Cannon AFB NM 88103-5003

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14. ABSTRACT

Environmental Assessment (EA) to analyze the potential impacts of installation of a Digital Airport Surveillance Radar (DASR) on Cannon Air Force Base New Mexico. The proposed action is part of the National Airspace System (SAS) program developed by the Federal Aviation Administration (FAA) in cooperation with the Department of Defense (DoD) to modernize approach control systems in the United States and it territories. The DASR System is designed to replace the current AN/GPN-20 system at Cannon AFB.

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FINAL ENVIRONMENTAL ASSESSMENT
CANNON AFB, NEW MEXICO

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FINDING OF NO SIGNIFICANT IMPACT

Name of Action: Installation of Digital Airport Surveillance Radar at Cannon Air Force Base

The Department of Defense (DoD) proposes to construct a Digital Airport Surveillance Radar (DASR) system at Cannon Air Force Base in New Mexico. This proposed action is part of the National Airspace System (NAS) Program, the aviation system capital investment plan developed by the Federal Aviation Administration (FAA) in cooperation with the DoD to modernize approach control systems in the United States and its territories. DASR is a DoD-led contract to install airport surveillance radar equipment for both the DoD and FAA. The implementation of the NAS Program, which also includes the installation of DoD Advanced Automation Systems (DAAS) and Voice Communications Switching Systems (VCSS) at DoD bases, was previously evaluated in a programmatic Environmental Assessment (EA) and Finding of No Significant Impact (FONSI) (1995).

The EA for Cannon AFB addresses the site-specific impacts of locating a DASR system on Cannon AFB, and evaluates the consequences of the DASR system construction on both the natural and man-made environments. The DAAS and VCSS components of the NAS Program at Cannon AFB would be located within existing buildings and impacts are anticipated to be minor. The primary consequences of the DASR system evaluated in the EA involve the construction and operation of an ASR-11 radar system on Cannon AFB to replace the existing AN/GPN-20 radar.

The DASR system at Cannon AFB is needed to replace the existing AN/GPN-20 airport surveillance radar. The ASR-11 will improve system reliability, provide additional weather data, reduce maintenance cost, improve performance and provide digital data input to proposed new digital automation system air traffic controller displays. The proposed ASR-11 will take advantage of the significantly increased capabilities of digital technology. The new DASR system will serve to accurately locate aircraft in terms of range, azimuth and latitude; provide information regarding aircraft identification code; identify emergency conditions and report six discrete weather precipitation levels.

The No Action alternative was evaluated. This option would result in the continued use of the existing AN/GPN-20 radar. This would deny Cannon AFB the improved system reliability, additional weather data and improved performance offered by the new DASR system; thus, this alternative was not chosen. Three alternative sites (Site 2, Site 3 and Site 4) were evaluated for possible siting of the ASR-11. All three sites are situated in undeveloped fields on base. Site 2 is located between the intersection of the runways and the eastern base boundary, approximately 1,000 feet southeast of the existing AN/GPN-20. Site 3 is located between the runways and the former wastewater treatment lagoons, approximately 1,300 feet northeast of the existing AN/GPN-20.

If Site 2 or 3 were chosen as the preferred alternative, no significant adverse impacts associated with land use, socioeconomics, utilities/transportation, noise, air quality, geology/soils, surface water and groundwater, biological resources, cultural resources, or aesthetics or would be anticipated. Vegetation, consisting primarily of mixed field grasses at Site 2 and Site 3, would be cleared regardless of the site chosen. Utility connections for Site 2 and Site 3 would extend approximately 1,355 feet and approximately 1,500 feet, respectively, to connect to the existing power and telephone near the AN/GPN-20 facility. Fiber optic connections to Site 2 and Site 3 would extend 2,100 and 600 feet, respectively. The proposed power/telephone route for Site 2 and the fiber optic route for Site 3 could potentially intersect an Area of Concern (AOC 7), which may contain hazardous materials but has not been designated as an Installation Restoration Program (IRP) site or a Solid Waste Management Unit (SWMU) site. The design of the utility routes for Sites 2 and 3 must ensure no disturbance of this area is required.

Site 4 is situated in the southeastern portion of the base approximately 700 feet west of the eastern base boundary, just north of Afterburner Road, which runs in an east-west direction. If Site 4 were selected as the preferred alternative, no significant adverse impacts associated with land use, socioeconomics, utilities/transportation, noise, air quality, geology/soils, surface water, biological resources, or cultural resources would be anticipated. Vegetation, consisting primarily of mixed grasses, at the site would be cleared. Site 4 is located near the eastern boundary of the base and two private residences are located approximately 1,200 feet from the site. In addition, an active paintball field is located approximately 200 feet from Site 4. Selection of Site 4 could have a potential aesthetic impact. The telephone and power connection for Site 4 would extend approximately 2,500 feet along Afterburner Road. The fiber optic route, however, would extend 2,400 feet to the closest connection point located just north of Afterburner Road. The proposed fiber optic route could potentially intersect an active IRP site (SD-11/SWMU 86-90), which is scheduled to be remediated during calendar year 2004 (USAF, 2004c). A new facility is proposed to be constructed at this location once remediation efforts are complete. No construction is allowed through this site neither prior to remediation nor after the new facility is constructed (USAF, 2004c). The fiber optic route must be designed to avoid this contaminated area.

Operation of the DASR system is anticipated to have minimal long-term impacts to the natural and human environments. During normal operation of the ASR-11, the radar would generate radio frequency radiation (RFR); however, the RFR generated would be safe to humans at ground level and is not anticipated to pose harm to the general population. During operation of the DASR system, fuel would be stored in an aboveground storage tank (AST) and some hazardous materials, such as equipment oil or grease, may be used at the site. All hazardous materials utilized during operation would be used and disposed of in accordance with Cannon AFB policies and protocols and all applicable state and federal regulations in order to minimize the potential for media contamination. Consequently, operational use of hazardous materials is not anticipated to adversely affect the natural or human environments.

Few mitigation measures should be required during construction and operation of the facility. To minimize noise impacts during construction, mufflers would be used on construction equipment and vehicles. In addition, all equipment and vehicles used during construction would be maintained in good operating condition so emissions are minimized, thus reducing the potential for air quality impacts. Dust would be controlled onsite by using water to wet down disturbed areas. The temporary construction activities at any of the three alternative sites are not anticipated to impact stormwater runoff; however, during construction, all activities will follow the base best management practices guidelines to minimize sedimentation and erosion during storm events. All areas disturbed for the DASR system construction would be seeded with a grass mixture or covered with a geotextile fabric and crushed stone to stabilize the disturbed soils, in order to minimize the potential for erosion and sedimentation. All hazardous materials used during construction would be handled and disposed of in accordance with Cannon AFB policies and protocols and all applicable state and federal regulations. Traffic management measures would be developed to facilitate traffic flow and pedestrian access.

All three sites are acceptable from an environmental perspective. However, Site 4 is located approximately 200 feet from the paintball field and 1,200 feet from two private residences and would have aesthetic impacts upon these land uses. The utility route designs for all three sites could avoid AOC 7 and SD-11/SWMU 86-90. Based on this summary of effects, along with the detailed description of the effects provided in the Environmental Assessment, construction of the ASR-11 at Site 2, which is the site selected, will not have a significant impact on the natural or human environment. For this reason, no environmental impact statement needs to be prepared.

13JAN06

JOHN D. POSNER, Colonel, USAF
Commander, 27th Fighter Wing

Date

ACRONYMS AND ABBREVIATIONS

A/C	Alternating current
AAM	Annual Arithmetic Mean
AFB	Air Force Base
AGM	Annual Geometric Mean
AICUZ	Air Installation Compatibility Use Zone
AQCR	Air Quality Control Region
AM	Amplitude modulation (radio)
AN/GPN-12	Airport surveillance radar designation
ANSI	American National Standards Institute
AOC	Area of concern
ASR-11	Airport surveillance radar designation
AST	Above-ground storage tank
BMP	Best management practice
CATM	Combat Arms Training and Maintenance
CFR	Code of Federal Regulations
DASR	Digital Airport Surveillance Radar
DoD	Department of Defense
DRMO	Defense Reutilization and Marketing Office
EA	Environmental Assessment
EIS	Environmental Impact Statement
EPA	(US) Environmental Protection Agency
FAA	Federal Aviation Administration (Dept. of Transportation)
FCC	Federal Communications Commission
FM	Frequency modulation (radio)
FONSI	Finding of No Significant Impact
Hz	Hertz
IEEE	Institute of Electrical Electronics Engineers
IRP	Installation Restoration Program
IRPA	International Radiation Protection Association
kHz	Kilohertz
kW	Kilowatt
LOS	Line of Sight
m/sec	Meters per second
MHz	Megahertz
MPE	Maximum Permissible Exposure
MSSR	Monopulse Secondary Surveillance Radar
mW/cm^3	Milliwatts per square centimeter
$\mu g/m^3$	Micrograms per cubic meter
µm	Micrometers (microns)
NAAQS	National Ambient Air Quality Standards
NAS	National Airspace System
NCRP	National Council on Radiological Protection

NEPA	National Environmental Policy Act
nm	Nanometers
NMED	New Mexico Environment Department
nmi	Nautical mile
NPDES	National Pollutant Discharge Elimination System
NRHP	National Register of Historic Places
OSHA	Occupational Safety and Health Administration
PM-2.5	Particulate matter below 2.5 microns
PM-10	Particulate matter below 10 microns
ppm	Parts per million (by volume in air)
RAPCON	Radar Approach Control
RFR	Radiofrequency radiation
SHPO	State Historic Preservation Officer
USAF	United States Air Force
VOC	Volatile organic compound
WAN	Wide area network

EXECUTIVE SUMMARY

This environmental assessment (EA) has been prepared in accordance with the National Environmental Policy Act (NEPA) and its implementing instructions. The EA provides analysis sufficient to determine whether to prepare an Environmental Impact Statement (EIS) or a Finding of No Significant Impact (FONSI) and to aid federal agencies in complying with NEPA when no EIS is required.

This EA describes the proposed project to install a Digital Airport Surveillance Radar (DASR) system at Cannon Air Force Base (AFB) New Mexico. This proposed action is part of the National Airspace System (NAS) Program, the aviation system capital investment plan developed by the Federal Aviation Administration (FAA) in cooperation with the Department of Defense (DoD) to modernize approach control systems in the United States and its territories. DASR is a DoD-lead contract to install airport surveillance radar equipment for both the DoD and FAA.

The NAS program will comprehensively upgrade air traffic control systems infrastructure by systematically replacing analog systems with state-of-the-art, digital technology. The purpose of the DASR component of the NAS program is to detect and process aircraft position and weather conditions at airfields. The DASR system will use the ASR-11 radar to accurately locate aircraft, in terms of range, azimuth, and altitude; provide information regarding aircraft identification code; identify emergency conditions; and report six discrete weather precipitation levels. The ASR-11 for Cannon AFB is needed to replace the older existing AN/GPN-20 Airport Surveillance Radar.

The DASR facilities for Cannon AFB would consist of: a 20-foot tall rotating radar antenna mounted on a 57-foot tower, a concrete radar equipment shelter, an emergency engine generator in a concrete shelter, utility cabling, electronic equipment grounding systems, and a 1,000-gallon above-ground fuel storage tank. Facility construction would include separate concrete foundations for the antenna tower, the equipment shelter and the engine generator shelter, a 140-foot by 140-foot site fence, and an access road. Site work, inclusive of minor regrading and the installation of geotextile fabric beneath six inches of crushed stone, would occur within a 0.59

acre (160 feet by 160 feet) area. Additional improvements, beyond the site area, would include an unpaved access road and between 2,100 – 4,900 feet of utility trenching (depending on the site chosen) to connect the site to existing electrical, telephone, and fiber optic connections. Once the new DASR system is operational, the existing AN/GPN-20 will be dismantled and structures will be razed. The ground would be reclaimed by Cannon AFB.

Initial site selection screening criteria identified seven sites (Sites 1 through 7). Site selection screening criteria applied as part of the preliminary down-select teleconference held on March 26, 2003 resulted in the elimination of four of the original sites. Sites 1 and 7 were eliminated from the line of sight (LOS) survey consideration due to their close proximity to the base boundary and the resulting high level of vulnerability. Site 6 was eliminated from further consideration for two reasons: 1) close proximity to the base boundary and 2) planned construction of a radio field with a new high frequency (HF) antenna in the vicinity. Site 5 was eliminated from further consideration due to the potential lack of coverage of planes leaving and entering Runway 31. The three remaining alternative sites (Sites 2, 3, and 4) on Cannon AFB have been identified as potential locations for the ASR-11, based on operational, construction, and environmental siting criteria contained in the Cannon AFB *Integrated Site Survey Report* (USAF, 2003a). These three sites are evaluated in this EA.

All three of the selected sites are located within the base boundary and east of the runways. Site 2 is located between the intersection of the runways and the eastern base boundary, approximately 1,000 feet southeast of the existing AN/GPN-20. Site 3 is located just off Thunderbird Street between the runways and the former wastewater treatment lagoons, approximately 1,300 feet northeast of the existing AN/GPN-20. Site 4 is situated in the southeastern portion of the base approximately 700 feet west of the eastern base boundary, just north of Afterburner Road, which runs in an east-west direction.

Issues which must be addressed during construction at any of the sites are elevated noise levels, increased dust, traffic and access disruption, aesthetic effects, and storm water management. Potential impacts in these areas would be reduced using standard mitigation measures as outlined below:

- To minimize noise impacts during construction, mufflers would be used on construction equipment and vehicles.
- All equipment and vehicles used during construction would be maintained in good operating condition so emissions are minimized, thus reducing the potential for air quality impacts.
- Dust would be controlled on-site by using water to wet down disturbed areas.
- All areas disturbed for the DASR system construction would be seeded with a grass mixture or covered with a geotextile fabric and crushed stone to stabilize the disturbed soils, in order to minimize the potential for erosion and sedimentation.
- During construction, all activities would follow the base best management practices (BMPs) guidelines to minimize sedimentation and erosion during storm events.
- All hazardous materials used during construction of the ASR-11 would be handled and disposed of in accordance with Cannon AFB policies and protocols and all applicable state and federal regulations.

Potential future impacts associated with operation of the ASR-11 facility would be minimized through use of mitigation measures including the following:

- All hazardous materials used during operation of the ASR-11 would be handled and disposed of in accordance with Cannon AFB policies and protocols and all applicable state and federal regulations.
- Due to the potential for RFR hazards during operation and maintenance, warning signs, indicating the safe distance from the operating radar, would be installed at the facility perimeter.

All three sites are acceptable from an environmental perspective, with the potential need for slight modifications. Site 4 could have a potential aesthetic impact due to the presence of two single-family homes located approximately 1,200 feet from the site with no visual barrier between the houses and the site. In addition, a paintball field is located approximately 200 feet from Site 4. The fiber optic route from Site 2 and the power/telephone route from Site 3 could potentially intersect an Area of Concern (AOC 7) as defined by the Installation Restoration Program (IRP). Similarly, the fiber optic route from Site 4 could potentially intersect an IRP/Solid Waste Management Unit (SWMU) site located in an area of airfield operations just north of Afterburner Road. Table ES-1 provides a summary of the potential environmental impacts associated with each of the alternative sites. Due to operational and other base considerations, the Air Force has selected Site 2 as the preferred ASR-11 location; however, this EA identifies potential impacts associated with placing the ASR-11 at each of the alternative sites.

Table ES-1. Environmental Impact Summary Matrix for the Alternative ASR-11 Sites for Cannon AFB

Category	No Action Alternative	Removal of Existing AN/GPN-20 System	Installation of the ASR-11 at Site 2	Installation of the ASR-11 at Site 3	Installation of the ASR-11 at Site 4
Land Use	No Impact	Land currently occupied by the AN/GPN-20 could be reclaimed by Cannon AFB.	All sites are within land designated as Open Space. The Cannon AFB Community Planner has indicated the installation of an ASR-11 at any of the sites would be consistent with this land use type.		
Socioeconomics	No Impact	Dismantling of AN/GPN-20 expected to have short-term minor contribution to local economy; no long-term impacts are expected.	Installation of ASR-11 expected to have short-term minor contribution to the local economy; no long-term impacts are expected.		
Utilities and Transportation	No Impact	No impacts to utilities are anticipated. Minor short-term impacts are possible to on-base traffic during dismantling.	A minimal disruption of the electrical system may be expected during ASR-11 installation. Minor short-term impacts to on-base traffic are possible during ASR-11 installation. The potential for impacts are expected to be greater as the distance from existing utilities increases.		
			Lengths of new utility connection: 1,335 feet for electric and telephone; and 2,100 feet for fiber optic.	Lengths of new utility connection: 1,500 feet for electric and telephone; and 600 feet for fiber optic.	Lengths of new utility connection: 2,500 feet for electric and telephone; and 2,400 feet for fiber optic.
Noise	No Impact	Dismantling of AN/GPN-20 would create only minor short-term noise impacts due to construction activities, compared to proximate flightline activities.	Elevated noise levels during construction will be short-term and minimal. Operation of ASR-11 would not generate excessive or persistent levels of noise.		
Air Quality	No Impact	Short-term impacts from removal of AN/GPN-20 expected to consist of dust generation from construction activities and are anticipated to be minimal.	Short-term impacts from installation of ASR-11 expected to consist of dust generation from construction activities and are anticipated to be minimal. Long-term impacts associated with each alternative consist of evaporative fuel loss from aboveground storage tank and emissions from on-site emergency generator. Neither source is anticipated to represent a substantial impact to air quality.		
Geology and Soils	No Impact	No Impact	No Impact	No Impact	No Impact
Surface Water & Groundwater	No Impact	Dismantling of AN/GPN-20 would not impact surface or groundwater.	No surface water resources are located proximate to sites. Temporary construction activities not anticipated to substantially affect existing stormwater runoff patterns. However, during construction, all activities would follow base BMPs to minimize sedimentation and erosion during storm events.		
Biological Resources	No Impact	No Impact	Clearing of approximately ½ acre of mixed grasses and potentially scattered shrubs; possible limited wildlife displacement at site.		
Aesthetic Resources	No Impact	No Impact	Site is within an undeveloped portion of the base with low traffic volume. Nearby AN/GPN-20 currently acts as a vertical element in the landscape. No impact anticipated.	Site is within an undeveloped portion of the base near the run-up pad and runways. Nearby AN/GPN-20 currently acts as a vertical element in the landscape. No impact anticipated.	Site 4 is located 1,200 feet from two private residences and 200 feet from an active paintball field. No other vertical elements are present in the immediate area; thus, potential long-term aesthetic impact could occur.
Cultural Resources	No Impact	No cultural resources are known to exist at the radar site; therefore no impacts are anticipated.	The New Mexico State Historic Preservation Officer (SHPO) indicated no historic properties would be affected by the project. If archaeological materials are exposed during construction, all work will cease and appropriate actions will be taken.		
Pollution Prevention and Hazardous Waste	Hazardous materials used during O&M of facility would continue being handled in compliance with all applicable regulations and base policies, therefore no impacts expected.	Portions of the radar facility may contain lead paint, which has the potential to chip off during the dismantling. Appropriate action will be taken as required.	No subsurface contamination is expected to be encountered at site; however, fiber optic route trenching may intersect an Area of Concern (AOC). Hazardous materials used during facility operation would be handled in compliance with base policies.	No subsurface contamination is expected to be encountered at site; however, the power/telephone route trenching may intersect an AOC. Hazardous materials used during facility operation would be handled in compliance with base policies.	No subsurface contamination is expected to be encountered at site; however, fiber optic route trenching may intersect an IRP/SWMU site. Hazardous materials used during facility operation would be handled in compliance with base policies.
Electromagnetic Energy	Existing radar system would continue operating in accordance with base protocol, no impact anticipated.	No Net Impact	No impacts expected. Due to the potential for RFR hazards during operation, warning signs, indicating the safe distance from the operating radar, would be installed at the facility perimeter.		

1.0 PURPOSE AND NEED FOR ACTION

1.1 INTRODUCTION

This EA addresses the Proposed Action and the No-Action Alternative in accordance with the National Environmental Policy Act (NEPA) (42 United States Code [USC] 4321-4347), Council on Environmental Quality (CEQ, 1978) Regulations for Implementing the Procedural Provisions of NEPA (40 Code of Federal Regulations [CFR] §§ 1500-1508), and 32 CFR 989 et seq., *Environmental Impact Analysis Process* (formerly known as Air Force Instruction [AFI] 32-7061). NEPA procedures were established to ensure environmental information is available to public officials and citizens before decisions are made and before actions are taken.

According to these instructions, the environmental assessment is a written analysis which serves to (1) provide analysis sufficient to determine whether to prepare an Environmental Impact Statement (EIS) or a Finding of No Significant Impact (FONSI); and (2) aid federal agencies in complying with NEPA when no EIS is required. If this EA were to determine the proposed action would significantly degrade the environment, significantly threaten public health or safety, or generate significant public controversy, then an EIS would be completed. An EIS involves a comprehensive assessment of project impacts and alternatives and a high degree of public input. Alternatively, if this EA results in a FONSI, then the action would not be the subject of an EIS. The EA is not intended to be a scientific document. The level and extent of detail and analysis in the EA is commensurate with the importance of the environmental issues involved and with the information needs of both the decision-makers and the general public.

The proposed action addressed in this EA is the construction of a Digital Airport Surveillance Radar (DASR; specifically, an ASR-11) for Cannon Air Force Base (AFB) New Mexico. This proposed action is part of the Department of Defense (DoD) National Airspace System (NAS) Program, which involves installation of new air traffic control equipment on U.S. Army, U.S. Navy, and USAF bases throughout the country and at overseas DoD installations. This radar system is also being installed at commercial airports

under the authority of the Federal Aviation Administration (FAA). The implementation of the NAS program at DoD bases was previously evaluated in a programmatic EA and FONSI (USAF, 1995a), which fully detail the need for the program. The programmatic EA and FONSI are available on the internet at http://www.hanscom.af.mil/esc-bp/pollprev/environmental_assessments.htm. Environmental review at FAA airfields is being conducted separately by the FAA.

The programmatic EA for the NAS program committed to completing site-specific NEPA documentation tiered from the programmatic EA for individual NAS sites. This EA addresses the site-specific impacts of locating an ASR-11 on Cannon AFB, and evaluates the consequences of constructing and operating this ASR-11 system on the natural and man-made environments.

An AF Form 813, accompanied by a description of Proposed Action and Activities, was prepared for this project. Cannon AFB staff reviewed the documents and determined an EA was necessary.

1.2 PURPOSE OF THE PROPOSED ACTION

The NAS program was developed to modernize military air traffic control systems in the United States and its territories. DoD NAS is a component of the aviation system capital investment plan developed by the FAA. Pursuant to the Program Management Directive (USAF, 1994), the DoD must provide services within its delegated airspace comparable to the services which FAA provides to civil aircraft in civilian airspace. These services include: flight following, separation, expeditious handling, radar approach control, and landing.

The purpose of the DASR component of the USAF NAS program is to detect and process aircraft position and weather conditions in the vicinity of USAF airfields. The DASR will serve to accurately locate aircraft, in terms of range, azimuth, and altitude; provide information regarding aircraft identification code; identify emergency conditions; and

report six discrete weather precipitation levels. The new radar facility for Cannon AFB will not increase or decrease the current number of flights, change aircraft patterns, or otherwise alter existing base operations.

1.3 NEED FOR THE PROPOSED ACTION

The NAS program is comprehensively upgrading air traffic control systems infrastructure by systematically replacing analog systems with state-of-the-art digital technology. The ASR-11 is needed at Cannon AFB to replace the existing AN/GPN-20 airport surveillance radar, which was installed in 1985. The proposed ASR-11 will take advantage of the significantly increased capabilities of digital technology, enabling digital data input to proposed new digital automation system air traffic controller displays. Additionally, the ASR-11 will improve system reliability, provide additional weather data, reduce maintenance cost, and improve performance.

2.0 DESCRIPTION OF THE PROPOSED ACTION AND ALTERNATIVES

The proposed action is the installation of an ASR-11 at Cannon AFB New Mexico (Figure 2-1) to replace the existing AN/GPN-20 radar. After consideration of operational and base concerns, the Air Force has selected a preferred site for the radar (Site 2). Alternatives to the proposed action include no action, or installation of the ASR-11 at one of the alternative sites. The no-action alternative consists of **not** constructing the ASR-11 facility and would involve continued use of the existing AN/GPN-20 system. Three potential sites (Sites 2, 3, and 4) were identified for Cannon AFB (Figure 2-2), in accordance with the NAS Siting Plan (USAF, 1995b) and FAA Order 6310.6 *Primary and Secondary Terminal Radar Siting Handbook*, as well as site-specific criteria identified in the Cannon AFB *Integrated Site Survey Report* (USAF, 2003a). This EA discusses and evaluates potential impacts associated with the placement of the ASR-11 at each of the alternative sites and also summarizes the potential impacts associated with the no-action alternative.

2.1 PROPOSED ACTION: DASR AT CANNON AFB

2.1.1 DASR System

The DASR system would detect and process aircraft position and weather conditions at the airfield. The ASR-11 would have clutter rejection, target accuracy, and probability of detection equal to or better than the existing AN/GPN-20 radar. The DASR system would consist of two subsystems: the Primary Surveillance Radar and the Monopulse Secondary Surveillance Radar.

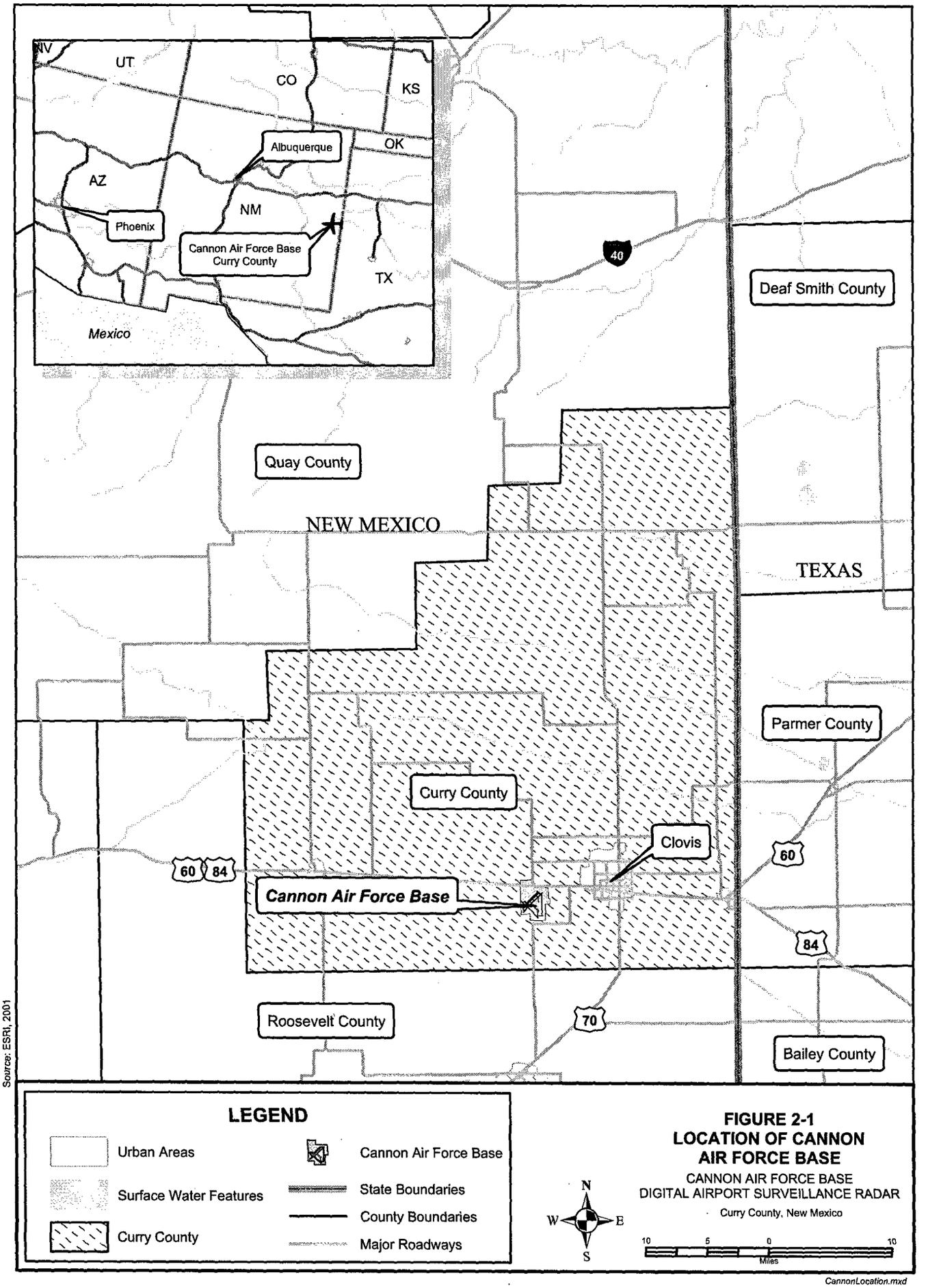
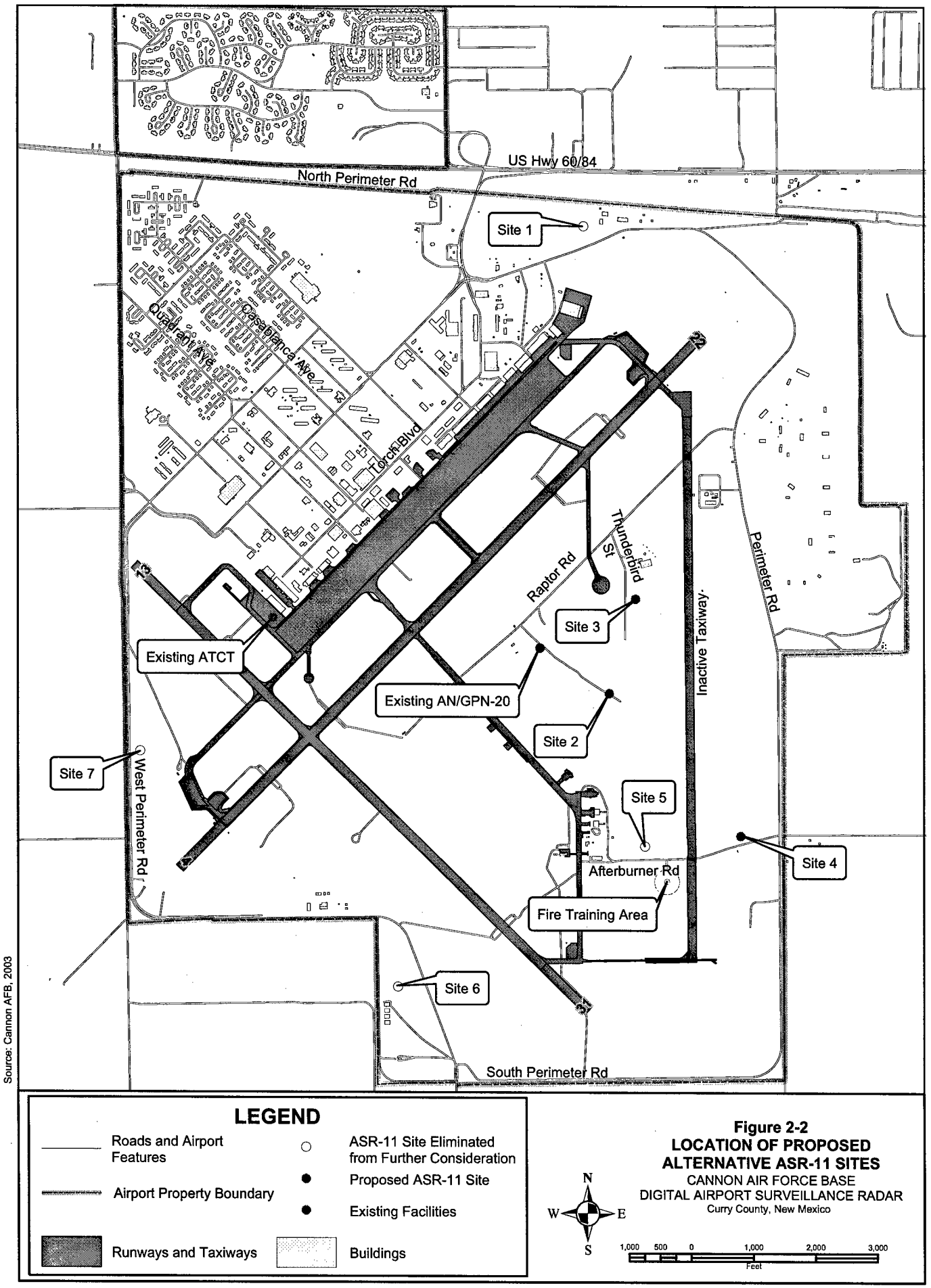


FIGURE 2-1
LOCATION OF CANNON AIR FORCE BASE
CANNON AIR FORCE BASE
DIGITAL AIRPORT SURVEILLANCE RADAR
Curry County, New Mexico



Source: Cannon AFB, 2003

Figure 2-2
LOCATION OF PROPOSED ALTERNATIVE ASR-11 SITES
CANNON AIR FORCE BASE
DIGITAL AIRPORT SURVEILLANCE RADAR
Curry County, New Mexico

CannonSites - EA.mxd

The Primary Surveillance Radar would transmit electromagnetic waves in the form of radio frequency pulses, which backscatter from the surface of aircraft, or other "targets of opportunity". The radar would measure the time required for an echo to return and the direction of the signal in order to determine the target's range and azimuth, respectively.

By comparing variations in returned signal parameters, such as phase differences between pulses, the radar could separate moving targets from stationary clutter, such as mountains and trees. The primary radar would also report six discrete weather precipitation levels (from mild to hazardous) via a processing channel dedicated to weather detection and reporting. Operational characteristics of the new ASR-11 primary surveillance radar as compared to the existing AN/GPN-20 are shown in Table 2.1-1.

Table 2.1-1 Comparison of Characteristics of Existing AN/GPN-20 Primary Surveillance Radar and Proposed ASR-11

	Existing AN/GPN-20	**Proposed ASR-11**
Frequency	2710 and 2790 MHz	2700-2900 MHz; 2 frequencies separated by at least 30 MHz
Power Peak	500 kW	19.5 kW (1 microsec) 18.0 kW (89 microsec)
Average Power	363 kW	1.6 kW (Solid state)
Pulse Repetition Frequency	1040 pulses/second	720-1050 pulses/second

Sources: USAF, 2003a; Belden, 1999; MITRE, 1997

The Monopulse Secondary Surveillance Radar (MSSR, also called the beacon radar) would be a cooperative system consisting of ground-based beacon interrogator/receiver systems and existing aircraft-based transponders. The secondary radar would obtain additional information, such as identification code, barometric altitude, and emergency conditions, from an aircraft transponder. Various processing techniques would be used to decipher both overlapping responses from multiple aircraft (synchronous garble) and aircraft responses to other beacon systems

(asynchronous interference). The beacon radar would also provide rapid identification of aircraft in distress. The MSSR would transmit at a frequency of 1030 MHz and receive at a frequency of 1090 MHz.

The DASR facilities at the Cannon AFB site would consist of: a 20-foot tall rotating radar antenna mounted on a 57-foot tower, a concrete radar equipment shelter, a 135kW diesel emergency generator in a concrete shelter, utility cabling, electronic equipment grounding systems, and a 1,000-gallon double-walled aboveground fuel storage tank. Facility construction would include separate concrete foundations for the antenna tower, the equipment shelter and the generator shelter, a 140-foot by 140-foot site fence, and an unpaved access road. Site work, inclusive of minor regrading and the installation of geotextile fabric beneath six inches of crushed stone, would be within a 0.59-acre site (160 feet by 160 feet). Additional improvements, beyond the site area, would include an unpaved access road and utility trenching to connect the site to existing duct banks or manholes. The total structure height, including lightning rods on the antenna tower, would be 86 feet. A typical DoD ASR-11 facility is shown in Figure 2-3.

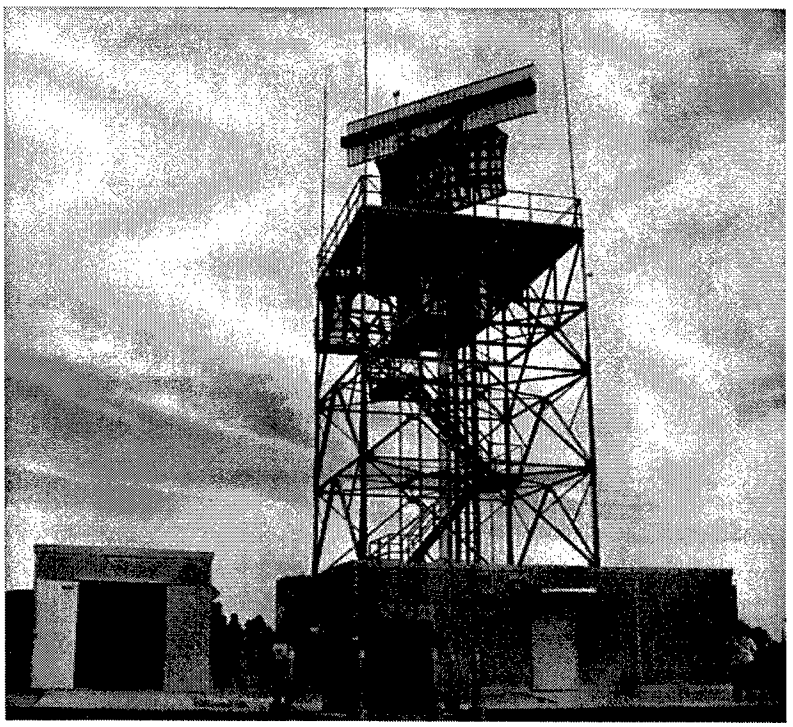


Figure 2-3 Typical ASR-11 Facility

Approximately 1,355 to 2,500 feet of utility trenching between the edge of the site and existing duct banks/manholes would be required to connect the ASR-11 to existing electric and telephone lines in the vicinity of the alternative sites. Also depending on the site chosen, between 600 and 2,400 feet of fiber optic cable would be required to connect the ASR-11 to the Radar Approach Control (RAPCON; USAF, 2003a).

Once the new DASR system is operational, the existing AN/GPN-20 would be dismantled and structures would be removed to existing grade. Associated existing utility lines would be cut off/capped at or close to ground level. Any subsequent below-ground activities would be the responsibility of Cannon AFB. Upon completion, the site of the existing AN/GPN-20 would be reclaimed by the base.

2.1.2 Alternative ASR-11 Sites

The three final alternative sites (Sites 2, 3, and 4) presented in this document were identified based on operational, construction, and environmental criteria. The operational criteria included the following (FAA, 1992):

- The site should not be located closer than 0.5 mile from the end of any existing or planned runway.
- The site should not be located closer than 0.5 mile from any point of required detection coverage.
- The site should not be located closer than 2,500 feet from any existing or planned electronic equipment installation or facility.
- The site should not be located less than 0.5 mile from National Weather Bureau radars and radiosonde equipment.
- The site should not be located closer than 1,500 feet to any above-ground object which would interfere or cause degradation in the ASR-11 operation.

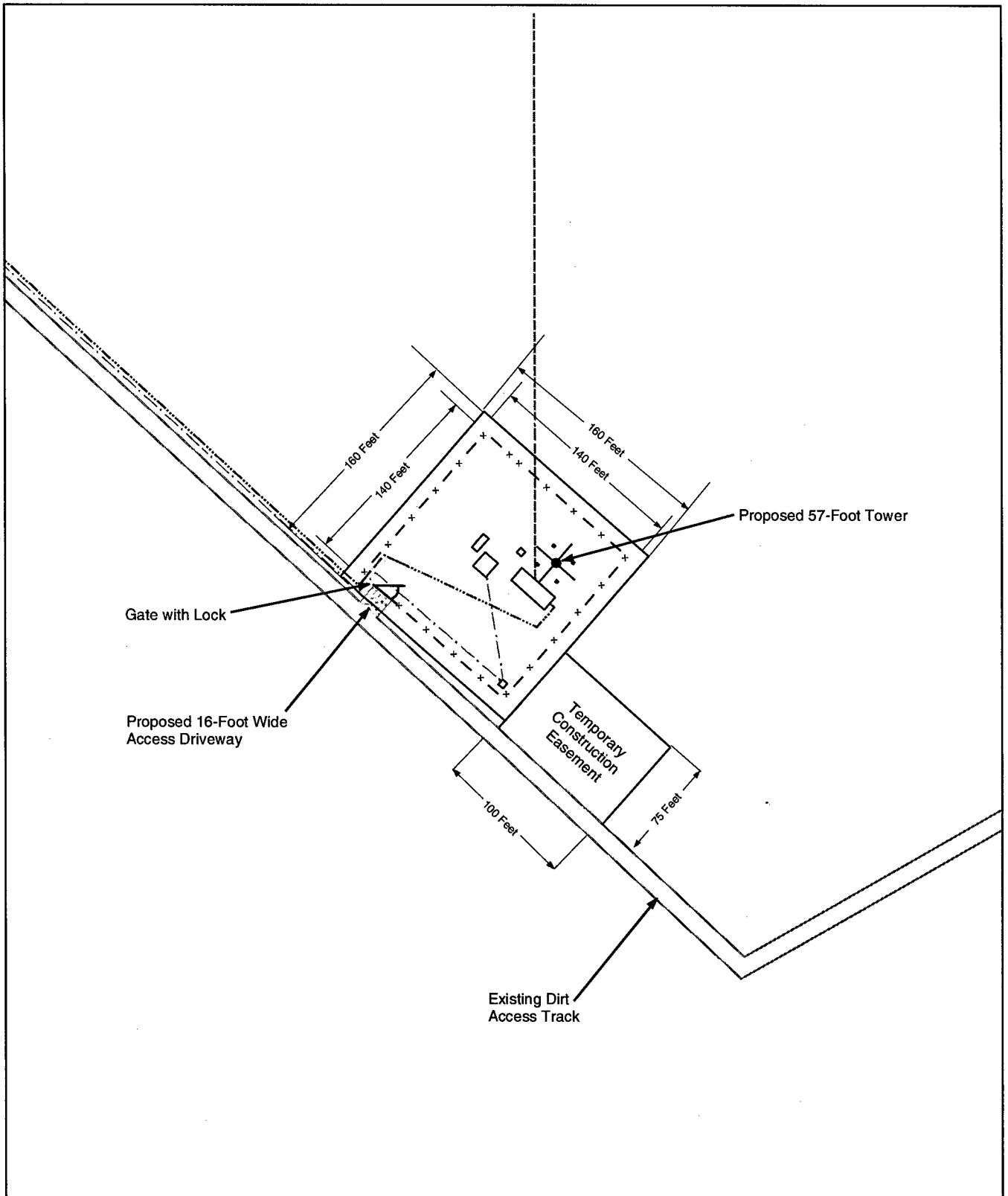
Construction criteria included avoiding sites with occupied existing structures, railroad tracks, highways, runways, taxiways or a slope greater than 20 percent. The environmental siting criteria included avoiding a number of sensitive resources, including: ecological/wildlife refuges, preserves, conservation areas and sanctuaries; wild and scenic rivers; prime and unique

farmlands; historical, archaeological, and cultural sites; wetlands; threatened and endangered species habitat; designated hazardous waste sites; and floodplains. The details of the siting process are described in the Cannon AFB *Integrated Site Survey Report* prepared by Raytheon Systems Company (USAF, 2003a).

Initial site selection screening criteria identified seven sites (Sites 1 through 7, Figure 2-1). Site selection screening criteria applied as part of the preliminary down-select teleconference held on March 26, 2003 resulted in the elimination of four of the original sites. Sites 1 and 7 were eliminated from the line of sight (LOS) survey consideration due to their close proximity to the base boundary and the resulting high level of vulnerability. Site 6 was eliminated from further consideration for two reasons: 1) close proximity to the base boundary and 2) planned construction of a radio field with a new high frequency (HF) antenna in the vicinity. Site 5 was eliminated from further consideration due to the potential lack of coverage of planes departing and approaching Runway 31. The three remaining sites (Sites 2, 3, and 4) were chosen to undergo a LOS survey and further environmental evaluation.

All three of the selected sites are located within the base boundary and east of the runways. **Site 2** (Figure 2-4) is located approximately 1,300 feet southwest of the end of Thunderbird Street in an area designated as open space. The site, which is open and flat, consists of mixed grasses and a few scattered yucca (*Yucca* sp.), tumbleweed (*Salsola* sp.), broom snakeweed (*Gutierrezia* sp.), and small elm trees (*Ulmus* sp.). A gravel road passes west of the site; however, no occupied buildings are in the immediate area of the proposed site.

Site 3 (Figure 2-5) is located between the runways and the former wastewater treatment lagoons, approximately 1,500 feet northeast of the existing AN/GPN-20. Just east of Thunderbird Street, Site 3 is several hundred feet east of the hot pad, which extends south from Runway 4/22. Vegetation at the site is limited to an herbaceous layer composed of mixed grasses including broom snakeweed, blue grama grass (*Bouteloua gracilis*) and side-oats grama (*Bouteloua curtipendula*). Occasional yucca and prickly pear cactus (*Opuntia* sp.) are also present. No occupied buildings are located in the vicinity of the site.



Source: Cannon AFB, 2003

LEGEND

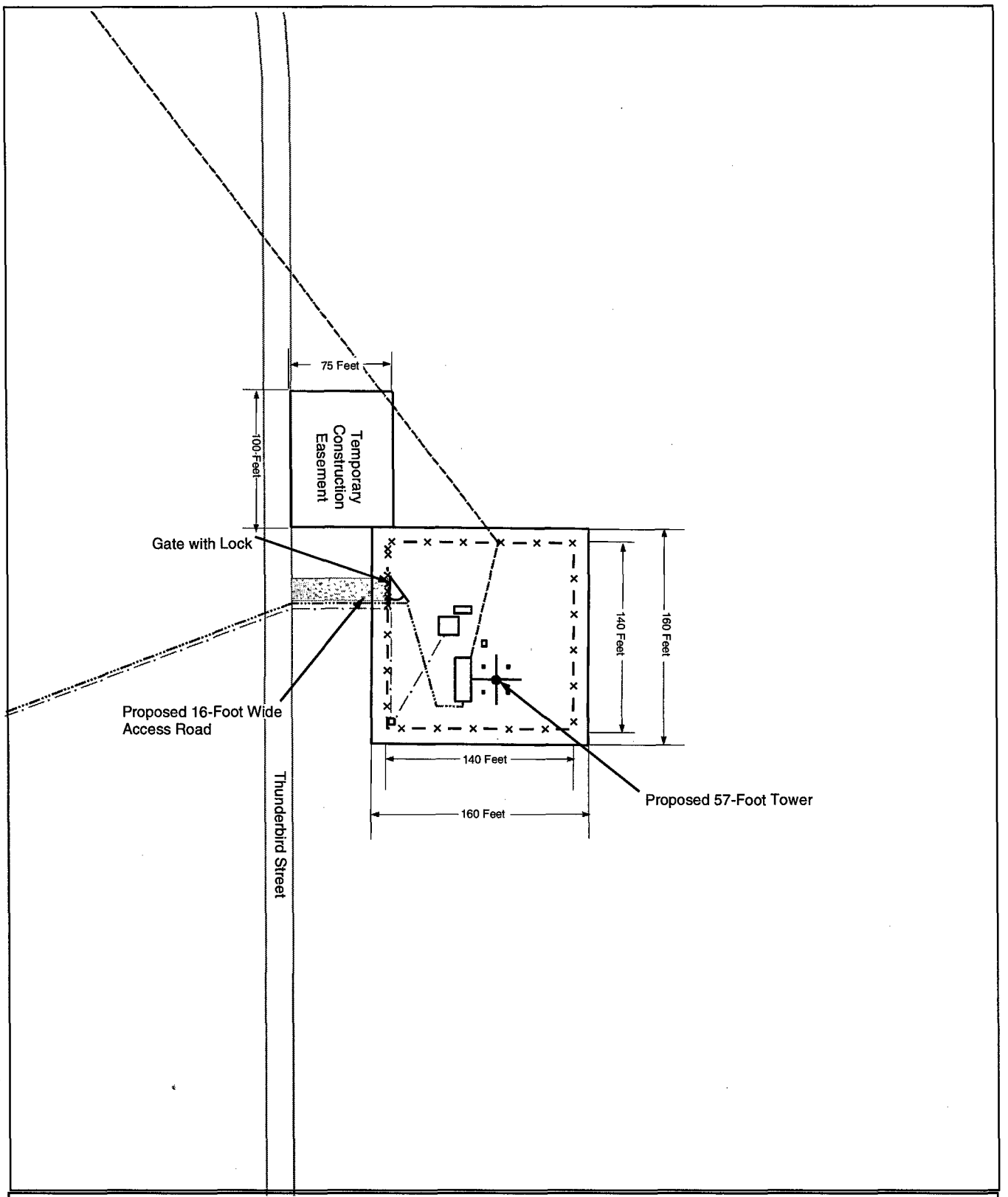
- Proposed ASR-11 Site
- Proposed Fiber Optic Cable
- Proposed Aboveground Power
- Proposed Telephone Line
- Proposed ASR-11 Site Features
- Proposed ASR-11 Site Fence
- Existing Access Track
- Proposed Access Driveway

N
W E
S

0 25 50 100 150 200
Feet

Figure 2-4
SITE LAYOUT OF PROPOSED ALTERNATIVE ASR-11 SITE 2
CANNON AIR FORCE BASE
DIGITAL AIRPORT SURVEILLANCE RADAR
Curry County, New Mexico

SiteLayout2 - EA.mxd



Source: Cannon AFB, 2003

LEGEND

- Proposed ASR-11 Site
- Proposed ASR-11 Site Fence
- Proposed Fiber Optic Cable
- Existing Road
- Proposed Aboveground Power
- Proposed Access Road
- Proposed Telephone Line
- Proposed ASR-11 Site Features

Figure 2-5
SITE LAYOUT OF PROPOSED ALTERNATIVE ASR-11 SITE 3
CANNON AIR FORCE BASE
DIGITAL AIRPORT SURVEILLANCE RADAR
Curry County, New Mexico

N W E S

0 25 50 100 150 200
Feet

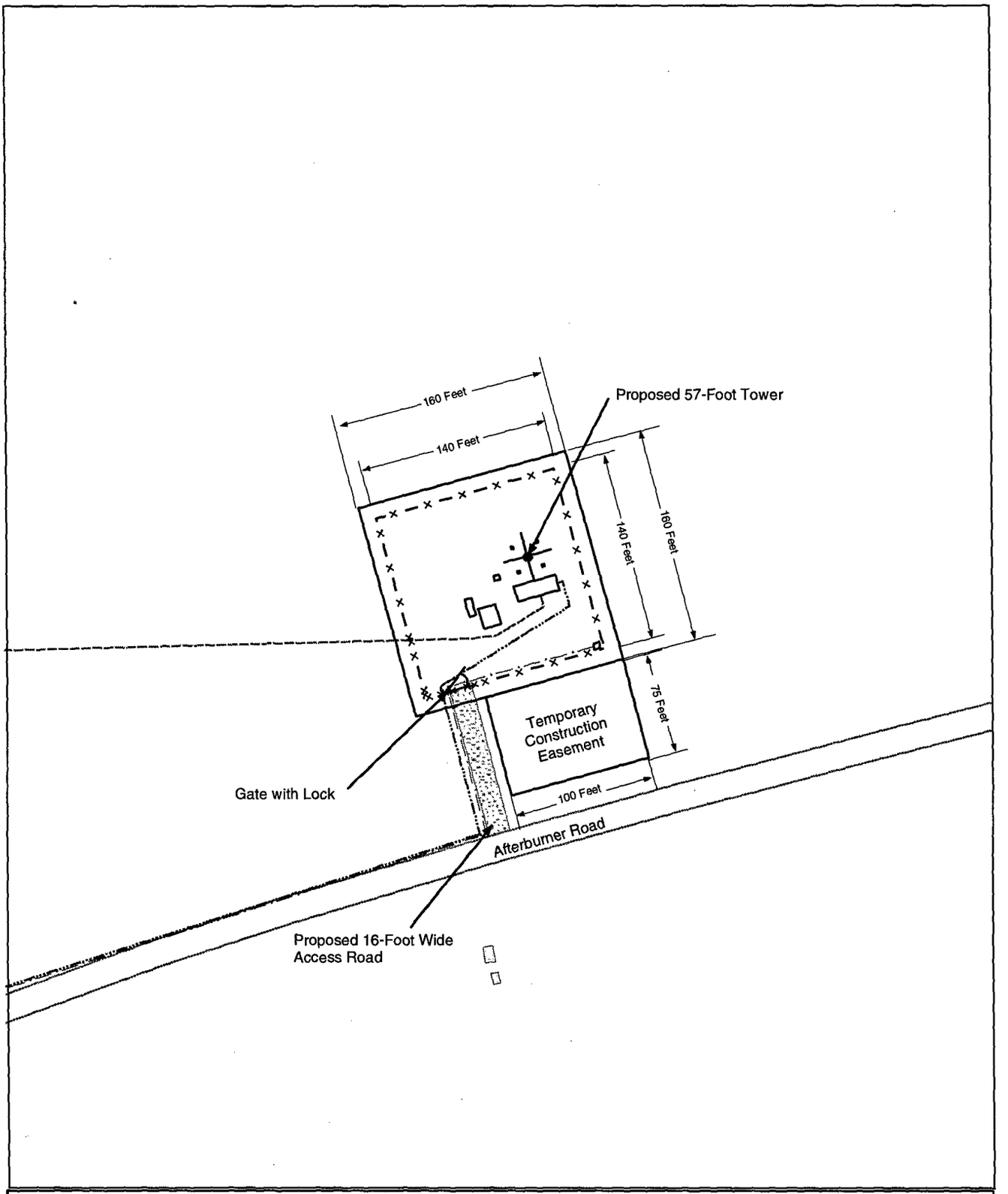
SiteLayout3.mxd

Site 4 (Figure 2-6) is situated in the southeastern portion of the base approximately 700 feet west of the eastern base boundary, just north of Afterburner Road, which runs in an east-west direction. Vegetation on the site consists mainly of mixed grasses including a few scattered yucca, tumbleweed, and ragweed (*Artemesia* sp.). No occupied buildings are located in the vicinity of the site.

2.2 NO ACTION ALTERNATIVE

Implementation of the No Action Alternative would result in the continued use of the existing AN/GPN-20 radar. Continued use and reliance on the AN/GPN-20 would deny Cannon AFB of the improved technology offered by the new DASR system. Cannon AFB would not benefit from the improved system reliability, additional weather data, reduced maintenance costs, and improved performance provided by the ASR-11 radar.

In this EA, conditions reflecting the No Action Alternative are discussed for each of the twelve main environmental parameters evaluated in Chapter Three. For each parameter, the No Action Alternative is characterized in the section addressing Future Baseline Without the Project.



Source: Cannon AFB, 2003

LEGEND

- Proposed ASR-11 Site
- Proposed Fiber Optic Cable
- Proposed Aboveground Power
- Proposed Telephone Line
- Proposed ASR-11 Site Features
- Proposed ASR-11 Site Fence
- Existing Access Road
- Proposed Access Road

N W E S

0 25 50 100 150 200
Feet

Figure 2-6
SITE LAYOUT OF PROPOSED ALTERNATIVE ASR-11 SITE 4
CANNON AIR FORCE BASE
DIGITAL AIRPORT SURVEILLANCE RADAR
Curry County, New Mexico

SiteLayout4.mxd

3.0 AFFECTED ENVIRONMENT

The existing environmental conditions and future conditions without the project are described for each site in order to provide a baseline against which potential impacts related to construction and operation of the ASR-11 can be determined. General conditions on Cannon AFB are presented for each of the parameters and site-specific detail is included, as available. Environmental conditions at the existing AN/GPN-20 site are also described to assess any potential issues associated with its removal. The following information was obtained from several documents and reports from Cannon AFB Environmental Flight staff and supplemented with data collected during site visits conducted in April 2003, as well as subsequent communications with base personnel.

3.1 LAND USE

The purpose of this section is to briefly characterize land uses on Cannon AFB. This section addresses existing land uses of the alternative ASR-11 sites (Site 2, Site 3, and Site 4) and the existing AN/GPN-20.

3.1.1 Existing Conditions

Cannon AFB is located in the high plains along the eastern border of New Mexico, approximately six miles west of Clovis, New Mexico. The base encompasses approximately 3,782 acres within rural Curry County and is surrounded mostly by agricultural lands, with limited commercial and residential land uses also present. Land uses on the base include airfield, airfield pavement, airfield operations and maintenance, administration, industrial, community commercial, community service, housing, medical, open space, outdoor recreation, and water. The land uses most prevalent on the base are airfield (approximately 1,470 acres) and open space (approximately 1,085 acres). Open space dominates the eastern side of the runways, with smaller portions scattered to the north, south and west of the runways (airfield).

The proposed ASR-11 candidate sites and the existing AN/GPN-20 are located to the east of the runways within areas designated as open space. The following describes the land use activities in the immediate vicinity of the sites.

Site 2 is located approximately 1,000 feet southwest of the end of Thunderbird Street in an open and flat area (Figure 2-2). A gravel road passes west of the site; however, no occupied buildings are in the immediate area of the proposed site. The Cannon AFB *General Plan* indicates a small area several hundred feet to the northeast designated as industrial land use (USAF, 1998). The closest buildings are the hush houses, located 1,500 feet to the south and the existing AN/GPN-20, 1,300 feet to the northwest. Several hundred feet to the north of the site, two small man-made hills are used for small arms training. The area surrounding site 2 and the proposed power, telephone, and fiber optic routes are classified as open space. The proposed fiber optic route, which extends west to the existing AN/GPN-20 crosses an explosives safety clear zone (USAF, 2003a).

Site 3, located just east of Thunderbird Street, is within an area of open space several hundred feet east of the hot pad, which extends south from Runway 4/22 (Figure 2-2). No occupied buildings are located in the vicinity of the site. Two small man-made hills, used for small arms training, are located several hundred feet south of Site 3. The nearest occupied building is the Combat Arms Training and Maintenance (CATM), approximately 500 feet to the north, where small arms training occurs. Site 3 is located approximately 300 feet west of the CATM safety clear zone. The CATM area is depicted as industrial land in the General Plan (USAF, 1998). A parking lot serving the CATM is located to the north of Site 3. A gravel access road runs adjacent to the site in a north-south direction. The existing AN/GPN-20 is located approximately 1,500 feet to the southwest. The proposed power, telephone, and fiber optic routes pass through open space; however, the power and telephone route also pass through an area designated as an explosives safety clear zone (USAF, 2003a).

Site 4 is located in the southeastern portion of the base within a flat area of open space (Figure 2-2). No occupied buildings are located in the vicinity of the site. Two private residences are visible from the site; however, they are located approximately 1,200 feet to the east/southeast. An on-base paintball field (designated as open space) is located approximately 200 feet to the south of Site 4. Over 2,000 feet to the west, within an area designated as industrial, is an area used

for fire training activities. Included in the area are an airplane frame and a two-story training facility surrounded by poles with lighting. The proposed power, telephone, and fiber optic routes extending from Site 4 pass through open space, although the proposed fiber optic route also crosses an area designated as an explosives safety clear zone. In addition, the fiber optic route terminates in an area designated as airfield operations.

The existing **AN/GPN-20** is located east of the runways adjacent to an existing dirt access road. No occupied buildings are located in the immediate vicinity of the radar facilities. The area encompassing the existing AN/GPN-20 is identified as open space, with airfield (runways) approximately 1,500 feet to the west.

3.1.2 Future Baseline without the Project

The future land use on Cannon AFB will continue to reflect an emphasis on airfield. No planned construction is proposed in the vicinity of the three candidate sites or the existing AN/GPN-20. In the future without the project, land use characteristics at **Sites 2, 3,** and **4** and the existing **AN/GPN-20** site are expected to remain as open space.

3.2 SOCIOECONOMIC CONDITIONS

3.2.1 Existing Conditions

This section addresses the population, employment, general economic condition, and housing in the study area. Socioeconomic data specific to the alternative ASR-11 site locations do not exist; however, relevant data for the state of New Mexico, Curry County, the city of Clovis, and Cannon AFB are presented.

3.2.1.1 Population

In 2002, Cannon AFB had a total population of 11,070 (USAF, 2002). This population is comprised of 3,898 military personnel and appropriated fund civilians, 306 non-appropriated fund civilians, 191 private employees, and 6,675 military dependants. Nearly 2,320 military retirees who reside in the surrounding community use base facilities (USAF, 2002).

Cannon AFB is contained within census tract 9 block group 9 (BG 9) and is surrounded by census tract 6 block group 4 (BG 4). These block groups exhibit some differing socioeconomic conditions. BG 9 (Cannon AFB) has a higher overall population and a lower percentage of persons living below the poverty level than BG 4 (Table 3.2-2). According to the Census 2000, the percentage of persons living below the poverty level in BG 4 (17.5 percent) was twice that of BG 9 (8.4 percent; Table 3.2-1). However, these percentages are lower than those for the state, county, and the city of Clovis. Both block groups generally reflect ethnic distribution similar to the city and county averages. However, BG 9 reflects a slightly higher percentage of Whites, a higher percentage of Blacks, and a significantly lower percentage of Hispanics or Latinos, in comparison to BG 4, the city of Clovis, or county. The block groups in the vicinity of Cannon AFB do not appear to contain unique populations with respect to poverty or ethnicity. Site 2, Site 3, Site 4, and the existing AN/GPN-20 are all located within BG 9.

Table 3.2-1 Income and Ethnicity Statistics for New Mexico, Curry County, the City of Clovis and Census Block Groups for the Areas of Cannon AFB[1]

	New Mexico	Curry County	City of Clovis	Census Tract / Block Group	
				Census Tract 6 Block Group 4	Census Tract 9 Block Group 9[2]
Total Persons	1,819,046	45,044	32,667	2,744	4,555
Number of Households	677,971	16,766	12,458	965	1,475
Persons Below Poverty Level	328,933	8,327	6,698	465	335
Percent of Persons Below Poverty Level	18.4	19.0	21.0	17.5	8.4
Land Area (sq mi)	121,355.5	1,405.9	22.4	119.6	5.9
ETHNICITY PERCENTAGES					
White	44.7	58.7	55.6	60.7	64.4
Black	1.7	6.5	6.9	1.8	11.9
American Indian	8.9	0.6	0.6	0.8	0.5
Asia/Pacific Islander	1.1	1.8	1.7	0.2	5.7
Hispanic or Latino	42.1	30.4	33.4	34.9	12.5
Other	1.6	2.0	1.7	1.6	4.9

Source: U.S. Department of Commerce, Bureau of Census, 2000.

1. Values based on 2000 U.S. Census data.
2. All of Cannon AFB is contained within census tract 9 block group 9.

3.2.1.2 Employment

The local economy is based on agriculture, railroad/freight, military, and light manufacturing. Cannon AFB is the largest employer in the immediate vicinity and is one of the major employers in New Mexico (USAF, 2002).

3.2.1.3 Housing

Housing associated with Cannon AFB totals 1,644 units. There are 683 family housing units on base, 611 units across U.S. Hwy 60/84 adjacent to the base, and an additional 350 units of government leased housing in Clovis and Portales. Cannon AFB has 12 dormitories accommodating up to 723 unaccompanied enlisted personnel. Temporary quarters provide additional 99 bed spaces on base (USAF, 2004d).

3.2.2 Future Baseline Without the Project

No known major expansions or modifications of activities at Cannon AFB are expected; thus, minimal changes to existing socioeconomic conditions for the base are anticipated in the future without the project.

3.3 UTILITIES AND TRANSPORTATION

3.3.1 Existing Conditions

The utility service at Cannon AFB, including availability in the vicinity of the alternative ASR-11 sites, is discussed in this section. The utilities include water, wastewater, solid waste, electricity, telephone, fiber optic, and natural gas. Transportation is described in Section 3.3.1.8.

3.3.1.1 Water Supply

All potable and non-potable water for Cannon AFB is provided by nine government-owned wells located on the installation. The Water Treatment Plant receives potable water from four wells (Wells 2, 3, 8, and 12), while the remaining two potable wells (Wells 5 and 7) have individual chlorine gas injection systems. The three non-potable wells (Wells 4, 4A, and 9) provide water for irrigation and fire-fighting purposes. Several water storage facilities exist throughout the

base. There are no water system pipelines in the immediate area of any of the three alternative sites, or the existing AN/GPN-20 (USAF, 1998).

3.3.1.2 Wastewater

Cannon AFB wastewater is treated either at the wastewater treatment plant constructed in 1998 or, for those facilities not proximate to the main portion of the base, individual wastewater disposal systems. A portion of the effluent from the WWTP is used to provide irrigation water for the golf courses, while the remainder is discharged to North Playa Lake, located on the east side of the base. There are no wastewater system facilities or pipelines located in the vicinity of the three alternative sites or the existing AN/GPN-20 (USAF, 1998).

3.3.1.3 Solid Waste

Solid Waste at Cannon AFB is collected and delivered to the Clovis Municipal Landfill for proper disposal. Demolition/construction debris is collected and disposed in a landfill located in the southeastern corner of the base in accordance with the New Mexico Solid Waste Management Regulations. Any asbestos containing material is disposed outside the base at an approved landfill. The base also utilizes a recycling program managed under a private contract. No solid waste facility collection or disposal sites are located in the vicinity of the three alternative sites or the existing AN/GPN-20.

3.3.1.4 Electricity

Electricity for Cannon AFB is provided by Xcel Energy. The existing distribution system consists of both underground and aboveground lines, with underground lines being more prevalent. The base operates at about 60 percent of the system capacity during peak demand times (USAF, 1998).

Primary underground electric lines cross the open space east of the runways near the location of **Site 2**. A portion of this same line also runs parallel to Thunderbird Street immediately adjacent to **Site 3**. No portion of the electric system on base is known to exist near **Site 4**, the closest

connection being 2,500 feet to the west in the Fire Training Area. The **AN/GPN-20** is serviced by existing underground primary electric lines.

3.3.1.5 Telephone

Dial-up telephone service connections closest to **Sites 2** and **3** are located near the existing **AN/GPN-20**, approximately 1,335 feet northwest and 1,500 feet southwest, respectively. The nearest dial-up connection to **Site 4** is located 2,500 feet west at the Fire Training Area.

3.3.1.6 Fiber Optic Cable

The base is served by a fiber optic backbone and a campus wide area network (WAN) which provides a medium for information transfer. **Sites 2** and **3** are located approximately 2,100 feet and 600 feet, respectively, from fiber optic cable at handhole 23B-8, which is located west of Thunderbird Street (USAF, 2003a). **Site 4** is located approximately 2,400 feet from fiber optic cable at handhole 23B-9, which is located north of Afterburner Road (USAF, 2003a).

3.3.1.7 Natural Gas

Natural gas at Cannon AFB serves most of the developed areas of the base, with the exception of more remote areas where propane is used for heating (USAF, 1998). Natural gas is provided to Cannon AFB by Public Service of New Mexico. No natural gas lines are known to run near any of the alternative ASR-11 sites or the existing AN/GPN-20.

3.3.1.8 Transportation

Cannon AFB has two gates, the Main Gate and Portales Gate. The three alternative ASR-11 sites and the existing AN/GPN-20 are closest to the Portales Gate at the southern end of the base.

Site 2 is located next to an existing dirt access track which provides access to the existing AN/GPN-20. **Site 3** is approximately 50 feet from the nearest vehicular access point along Thunderbird Street. **Site 4** is approximately 100 feet from the nearest access point along Afterburner Road (USAF, 2003a).

3.3.2 Future Without the Project

Some improvements to the base infrastructure systems are described in Cannon AFB's capital improvements program (USAF, 1998). However, the Cannon AFB Community Planner has indicated no currently proposed improvements would result in changes to the general vicinity of the alternative ASR-11 sites or the existing AN/GPN-20 (USAF, 2004b).

3.4 NOISE

The existing general noise environment of Cannon AFB is discussed in this section, as well as the noise environments of the three alternative ASR-11 sites and the existing AN/GPN-20 location. Many federal agencies use the day-night average sound level to describe noise and to predict community effects from long-term exposure to noise. In addition, this noise level classification system is used to determine the appropriateness of a given use of specific land (land use compatibility) relative to the average level of environmental noise experienced at the location. These guidelines are described in the *Air Installation Compatible Use Zone (AICUZ) Program Handbook* (USAF, 1991). Noise levels below 65 decibels are considered to be compatible with residential land use. Residential land use is discouraged in areas with a noise level between 65-70 decibels, strongly discouraged in areas with sound levels between 70 and 75 decibels, and considered generally unacceptable for areas with noise levels exceeding 75 decibels.

3.4.1 Existing Conditions

The primary source of noise in the vicinity of Cannon AFB results from normal base operation and aircraft usage and maintenance. Noise generated independent of aircraft flight noise on Cannon AFB, such as maintenance and shop operations, ground traffic, and construction is comparable to the noise generated in the surrounding community; therefore, noise generated during aircraft flight operations represents the most substantial noise source on the base.

The associated noise contours generally reflect proximity to the runways. The area of highest decibel readings (75 dB and higher) is in the immediate vicinity of the runways. Extended areas of higher level noise occur along the aircraft approach and departure corridors.

Sites 2, 3, and 4 are located east of the Cannon AFB runways. **Site 2** is located within the 70 to 75 dB contour; **Site 3** is located within the 75 to 80 dB contour; and **Site 4** is located in the under 65 dB zone. The existing **AN/GPN-20** is located within the 70 to 75 dB contour (USAF, 1998).

3.4.2 Future Baseline without the Project

No major changes in base activities are expected to occur in the vicinity of the alternative sites. Therefore, in the future without the project, the current noise conditions in the area of **Sites 2, 3,** or **4** and the existing **AN/GPN-20** are not anticipated to change.

3.5 AIR QUALITY

Air quality data specific to the alternative ASR-11 site locations and the existing AN/GPN-20 do not exist. However, information compiled from county and base-wide data are expected to represent site specific characteristics and are provided below.

The U.S. Environmental Protection Agency (EPA) defines ambient air in 40 CFR Part 50 as "that portion of the atmosphere, external to buildings, to which the general public has access." In compliance with the 1970 Clean Air Act and the 1977 and 1990 Clean Air Act Amendments, EPA has developed ambient air quality standards and regulations. The National Ambient Air Quality Standards (NAAQS) were enacted for the protection of the public health and welfare, allowing for an adequate margin of safety (EPA, 2002). To date, EPA has issued NAAQS for six criteria pollutants (Table 3.5-1): carbon monoxide (CO), sulfur dioxide (SO_2), ozone (O_3), nitrogen dioxide (NO_2), lead (Pb), and particulates (e.g., PM-10, particles with a diameter less than or equal to 10 μm). National primary standards are set to protect human health with an adequate margin of safety for even the most sensitive portion of the human population. Secondary standards are set for some pollutants to protect against damage to plants, animals, and materials (EPA, 1998).

The State of New Mexico has established state AAQS which are more restrictive than federal standards for CO, NO_2, and SO_2. New Mexico does not have standards for PM-10, O_3, and Pb. Table 3.5-1 presents a summary of the New Mexico AAQS applicable to Cannon AFB.

3.5.1 Existing Conditions

Cannon AFB is located within the Pecos-Permian Basin Intrastate AQCR (AQCR 155) (NMED, 2004). A recent review of EPA's air quality data indicated Cannon AFB is not located within a non-attainment area for any of the six criteria pollutants (EPA, 2004).

The major sources of air emissions at Cannon AFB are jet engine testing and painting operations. Other sources include fuel storage and the operation of heating boilers. Cannon AFB operates under a synthetic minor air quality permit from the New Mexico Environment Department's Air Quality Bureau. This permit encompasses stationary emissions, as well as emissions from construction activity (USAF, 2003b).

3.5.2 Future Baseline Without the Project

As noted in previous sections, no major projects are proposed for Cannon AFB at the time of preparation of this EA. Thus, no significant changes to air quality conditions for the base are anticipated in the future without the project.

3.6 GEOLOGY AND SOILS

3.6.1 Existing Conditions

General characteristics of soils and geology on the base are discussed in this section. Site-specific data relevant to the three alternative ASR-11 sites and the existing AN/GPN-20 are provided, as available.

Table 3.5-1 New Mexico and Federal Ambient Air Quality Standards

Air Pollutant	Averaging Time	New Mexico AAQS	Federal (NAAQS)	
			Primary	Secondary
Carbon Monoxide (CO)	8-hour	8.7 ppm	9 ppm	---
	1-hour	13.1 ppm	35 ppm	---
Nitrogen Dioxide (NO_2)	AAM	0.05 ppm	0.053 ppm	0.053 ppm
	24-hour	0.10 ppm	---	---
Sulfur Dioxide (SO_2)	AAM	0.02 ppm	0.030 ppm	---
	24-hour	0.10 ppm	0.14 ppm	---
	3-hour	---	---	0.50 ppm
Particulate Matter (PM-10)	AAM	---	50 $\mu g/m^3$	50 $\mu g/m^3$
	24-hr	---	150 $\mu g/m^3$	150 $\mu g/m^3$
Particulate Matter (PM-2.5) [a]	AAM	---	15 $\mu g/m^3$	15 $\mu g/m^3$
	24-hour	---	65 $\mu g/m^3$	65 $\mu g/m^3$
Total Suspended Particulates (TSP)	AGM	60 $\mu g/m^3$	---	---
	30-day	90 $\mu g/m^3$	---	---
	7-day	110 $\mu g/m^3$	---	---
	24-hr	150 $\mu g/m^3$	---	---
Hydrogen sulfide (H_2S)	1-hr[d]	0.010 ppm	---	---
	½-hr[e]	0.100 ppm	---	---
	½-hr[f]	0.030 ppm	---	---
Total Reduced Sulfur[b]	½-hr[d]	0.003 ppm	---	---
	½-hr[e]	0.010 ppm	---	---
	½-hr[f]	0.003 ppm	---	---
Ozone (O_3) [c]	1-hour	---	0.12 ppm	0.12 ppm
	8-hour	---	0.08 ppm	0.08 ppm
Lead (Pb) and Lead Compounds	Calendar Quarter	---	1.5 $\mu g/m^3$	1.5 $\mu g/m^3$

Notes:

AAM = Annual Arithmetic Mean; AGM = Annual Geometric Mean.

ppm = parts per million; $\mu g/m^3$ = micrograms per cubic meter.

(a) The PM-2.5 standard (particulate matter with a 2.5 micron diameter) was promulgated in 1997, and will be implemented over an extended time frame. Areas will not be designated as in attainment or nonattainment of the PM-2.5 standard until the 2003 – 2005 timeframe.

(b) Total reduced sulfur does not include H_2S.

(c) The 8-hour Ozone standard was promulgated in 1997, and will eventually replace the 1-hour standard. The USEPA plans to implement this standard beginning in 2004. During the interim, the 1-hour ozone standard will continue to apply to areas not attaining it.

(d) Entire state except for the Pecos-Permian Air Basin (AQCR 155), which includes De Baca, Chaves, Curry, Quay, and Roosevelt counties.

(e) Within the Pecos-Permian Air Basin.

(f) Within corporate limits of municipalities in the Pecos-Permian Air Basin, or within 5 miles of the corporate limits of municipalities having a population greater than 20,000 and within the Pecos-Permian Air Basin.

Sources: 40 Code of Federal Regulations 50; New Mexico Administrative Code 20.2.3.

3.6.1.1 Geology

The Ogallala Formation is the principal geologic unit in the High Plains aquifer in eastern New Mexico within which Cannon AFB is located. The Ogallala generally consists of an unconsolidated and poorly sorted sequence of gravel, sand, silt, and clay (USGS, 2004). Moderately to well-cemented zones within the Ogallala are resistant to weathering and form ledges in outcrop areas. The area has high mesas and plateaus capped in part by tertiary lava flows (USAF, 1997).

3.6.1.2 Soils

The soil type found in most abundance on Cannon AFB is Amarillo fine sandy loam, a common soil series for the general area. This soil series consists of very deep, well drained, moderately permeable soils derived from loamy eolian sediments from the Blackwater Draw Formation of Pleistocene age (USDA, 2004). Slopes in the area range from 0-2 percent (USAF, 1997). The alternative ASR-11 sites and the existing AN/GPN-20 are located in areas containing this dominant soil type.

3.6.2 Future Without the Project

No changes in geologic formations, or existing soil types and locations, are anticipated on Cannon AFB in the future without the project.

3.7 SURFACE WATER AND GROUNDWATER

3.7.1 Existing Conditions

The characteristics for surface water and groundwater on the base are discussed in this section and are expected to generally describe the area around the three alternative ASR-11 sites and the existing AN/GPN-20 radar.

3.7.1.1 Surface Water

Precipitation in the vicinity of Cannon AFB not lost to evaporation or infiltration drains to the east/southeast through ephemeral streams or collects in closed depressions known as playa lakes. A single playa lake at the southwest corner of the base collects a majority of the runoff from the base. Two wastewater treatment lagoons located to the east of the runways have been closed under the Installation Restoration Program. No permanent surface waters are located near **Sites 2, 3,** or **4** or the existing **AN/GPN-20**. Although the golf course is periodically flooded during high storm events, no portion of the base is located within a floodplain (USAF, 1997).

3.7.1.2 Groundwater

Cannon AFB lies above the Ogallala Aquifer, which developed in the unconsolidated sediments of the Ogallala Formation (USAF, 1997). The groundwater below Cannon AFB, including the area near **Sites 2, 3, 4** and the existing **AN/GPN-20** is approximately 280 feet below the ground surface (USAF, 2003c).

3.7.2 Future Without the Project

The surface and groundwater conditions at Cannon AFB and, specifically, near the candidate ASR-11 sites and the AN/GPN-20, are not anticipated to change in the future without the project.

3.8 BIOLOGICAL RESOURCES

3.8.1 Existing Conditions

This section contains descriptions of biological resources, including vegetation, wetlands, wildlife, and threatened or endangered species for Cannon AFB and its vicinity, including the alternative ASR-11 sites and the existing AN/GPN-20 site.

3.8.1.1 Vegetation

The agricultural fields which covered the area where Cannon AFB now stands are no longer in existence. These areas are now either landscaped, developed, or disturbed (USAF, 1997). **Site 2**

consists of mixed grasses and a few scattered yucca (*Yucca* sp.), tumbleweed (*Salsola* sp.), broom snakeweed (*Gutierrezia* sp.), and small elm trees (*Ulmus* sp.). Vegetation at **Site 3** is limited to an herbaceous layer composed of mixed grasses including broom snakeweed, blue grama grass (*Bouteloua gracilis*) and side-oats grama (*Bouteloua curtipendula*). Occasional yucca and prickly pear cactus (*Opuntia* sp.) are also present. Vegetation on **Site 4** consists mainly of mixed grasses including a few scattered yucca, tumbleweed, and ragweed (*Artemesia* sp.). The area surrounding the existing **AN/GPN-20** is dominated by mixed grasses and scattered low shrubs.

3.8.1.2 Wetlands

Review of a "Delineation Map of Waters of the US, including Wetlands, on Cannon AFB, NM, July 1996 Final" identified no wetlands or waters within the vicinity of **Sites 2, 3,** or **4,** or the existing **AN/GPN-20** site.

3.8.1.3 Wildlife

Common wildlife species in the region of Cannon AFB include pronghorn, coyote, mourning dove, common nighthawk, coachwhip snake, and ornate box turtle (USAF, 1997). Four habitat types identified on Cannon AFB are improved/landscaped habitat, semi-improved/mowed grassland, unimproved/disturbed grassland, and riparian/aquatic. These types provide a variety of habitat for many species of birds, reptiles, amphibians, and mammals (USAF, 1997). The areas surrounding Sites 2, 3, and 4 and the existing AN/GPN-20 are comprised of unimproved/disturbed grassland habitat for wildlife.

3.8.1.4 Threatened and Endangered Species

There are no known threatened or endangered species in the area of **Sites 2, 3, or 4** or the existing **AN/GPN-20** (USAF, 2004a).

3.8.2 Future Without the Project

The existing Integrated Natural Resource Plan has recently been revised and approved by the USF&WS. No future capital improvement plans are anticipated to significantly impact the biological resources at Cannon AFB.

3.9 AESTHETICS

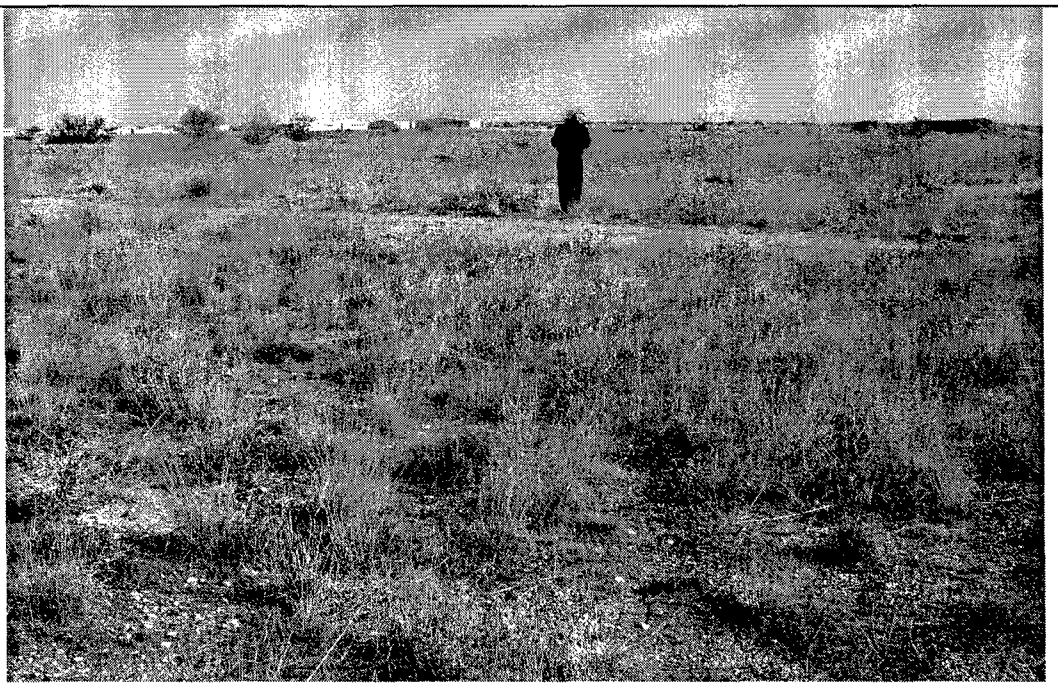
The purpose of this section is to characterize the aesthetic resources of the project area in order to provide a framework for determining the potential changes occurring as a result of the construction and operation of the ASR-11 at the alternative sites. Photographs of the alternative sites were taken during the site survey in April of 2003 and are provided as Figures 3-1, 3-2, and 3-3.

3.9.1 Existing Conditions

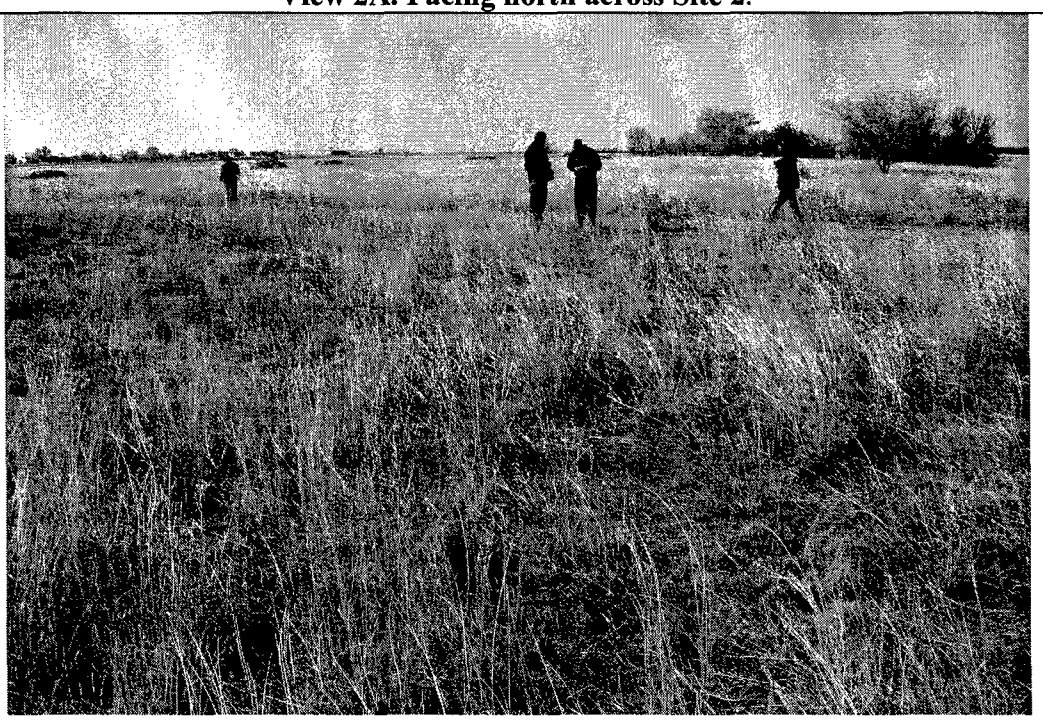
There is what may be described as a functional aesthetic quality on the base, with features like runways, aircraft hangars, lights, antennae, and towers considered to be an integral part of the Cannon AFB landscape. These basic features and the typical base activities give the impression of an organized and functional military installation. The Cannon AFB *General Plan*, published in 1998, addresses architecture and landscape design and their role in affecting the aesthetic quality of Cannon AFB.

Located in undeveloped areas of open space, the three alternative sites have similar landscapes: a relatively flat open area with sparse herbaceous vegetation and small scattered shrubs and trees. Although the landscape likely changes (from the photographs in the three figures) throughout the seasons, the dominating landscape is one characteristic of the Eastern High Plains, as this region of New Mexico is referred. Each of the sites has a land use designation of open space. The area surrounding the AN/GPN-20 facility is similarly open and flat with the radar tower acting as the only vertical element of the adjacent landscape.

Figure 3-1 Photographs Taken During April 2003 Site Visit of Cannon AFB ASR-11 Candidate Site 2

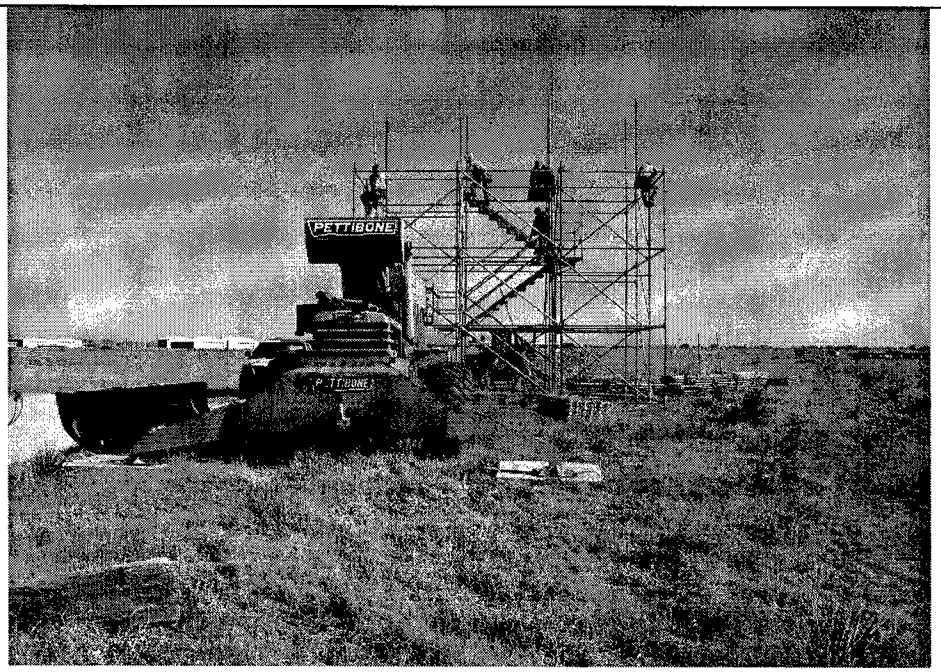


View 2A. Facing north across Site 2.

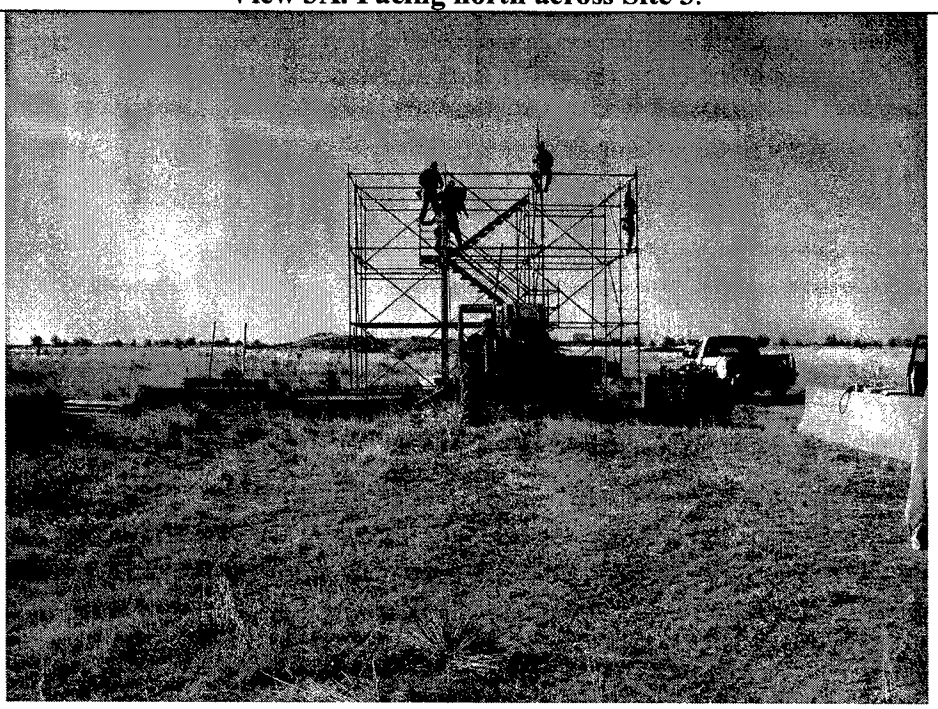


View 2B. Facing south across Site 2.

Figure 3-2 Photographs Taken During April 2003 Site Visit of Cannon AFB ASR-11 Candidate Site 3



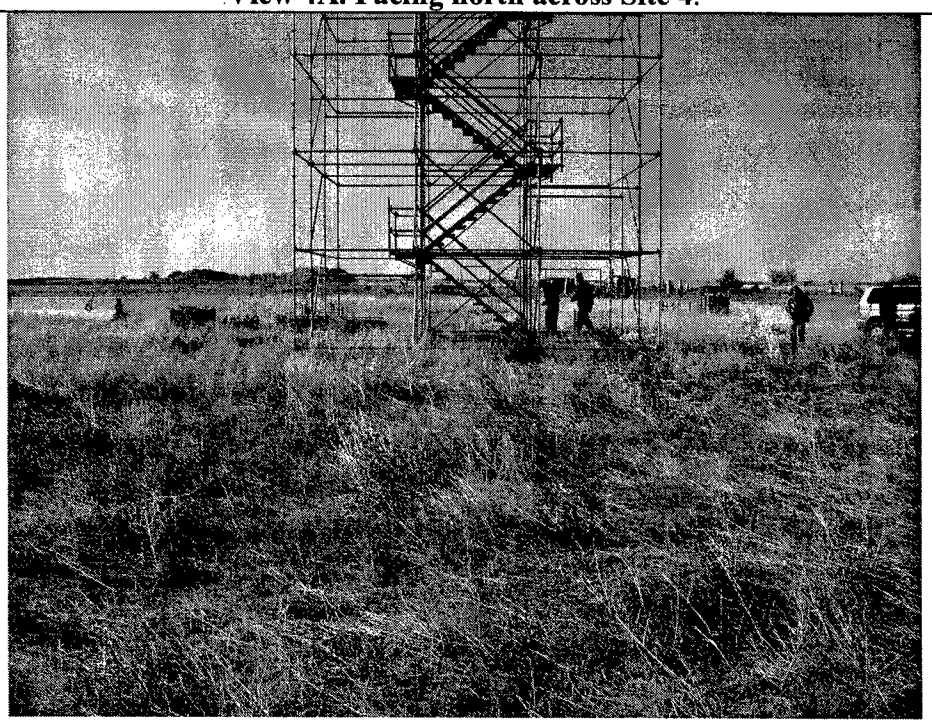
View 3A. Facing north across Site 3.



View 3B. Facing south across Site 3.

Figure 3-3 Photographs Taken During April 2003 Site Visit of Cannon AFB ASR-11 Candidate Site 4

View 4A. Facing north across Site 4.



View 4B. Facing south across Site 4.

Site 2 is located east of the runways. Views facing north and south across the site are provided in Figure 3-1. In this figure, View 2A, facing north, shows the two small hills to the northeast used for training, and the buildings (in the distance) in areas designated as airfield operations and maintenance. The two runways lie between the site and the airfield operations and maintenance buildings. View 2B, facing south across the site, shows the hush houses located behind a small cluster of trees. These buildings are within another area of airfield operations and maintenance. The AN/GPN-20 stands as a vertical element of the landscape approximately 1,350 feet to the west. Dirt access roads cross this open field connecting the AN/GPN-20, the runways, and Afterburner Road.

Site 3 is located east of the runways. Views facing north and south across the site are provided in Figure 3-2. In this figure, View 3A, facing north, shows the buildings (airfield operations and maintenance) on the northwest side of the runways and a portion of the parking lot for the CATM building to the northeast. View 3B, facing south across the site, shows the two hills used for small arms training. The scaffolding shown in the picture was temporarily erected during the line of sight survey in April 2003 and is not a permanent feature of the landscape. The main vertical element of the landscape is the existing AN/GPN-20 which stands approximately 1,500 feet from Site 3. Dirt access roads cross this open field connecting the AN/GPN-20, the runways, and Afterburner Road.

Site 4 is located east of the runways. Views facing north and south across the site are provided in Figure 3-3. In this figure, View 4A faces north toward the site and shows the lack of prominent features other than an open field. View 4B faces south across the site and shows two mounds of earth relocated from the demolition/construction debris landfill. To the south is Afterburner Road, although it is not visible due to the angle of the photograph. The scaffolding shown in the picture was temporarily erected during the line of sight survey in April of 2003. There are no vertical elements in the landscape at this site. Dirt access roads cross the open field to the north connecting the AN/GPN-20, the runways, and Afterburner Road.

3.9.2 Future Without the Project

At this time, there are no planned land use changes in the immediate vicinity of **Sites 2, 3,** or **4** which would substantially alter the future aesthetic conditions of its surroundings. The aesthetic characteristics of the area of the existing **AN/GPN-20** are not anticipated to change in the future without the project.

3.10 CULTURAL RESOURCES

This section describes cultural resources identified at Cannon AFB and indicates if any known cultural resource areas are located in the vicinity of the alternative ASR-11 sites or the existing AN/GPN-20.

3.10.1 Existing Conditions

Surveys for cultural resources on Cannon AFB were conducted in 1981, 1987, and 1994 (USAF, 1998). Due to the extensive development of the base, however, no significant sites eligible for the National Register of Historic Places (NRHP) were identified. Five buildings on base are greater than 50 years old and are considered potentially eligible for the NRHP (USAF, 2004b). No historic or archaeological resources, including these potentially eligible structures, are known to exist in the vicinity of the alternative ASR-11 sites (**Sites 2, 3,** or **4**) or the existing **AN/GPN-20**.

3.10.2 Future Without the Project

It is not anticipated there would be any substantial change in cultural resource conditions at the alternative sites or the existing AN/GPN-20 location in the future without the project.

3.11 POLLUTION PREVENTION AND HAZARDOUS WASTE

3.11.1 Existing Conditions

The following sections describe current conditions and practices on the base with regard to pollution prevention and hazardous waste.

3.11.1.1 Pollution Prevention

A Pollution Prevention Management Action Plan for Cannon AFB was signed in 2001 with the intent of describing ways in which the pollution prevention program is implemented on base (USAF, 2001). The pollution prevention program includes the overall goal of reducing the amount of potential pollutants produced on base and properly handling those which are produced. The base has adopted the Pollution Prevention Act hierarchy of goals in pollution prevention including: reducing the waste stream, recycling products/materials whenever possible, handling products/materials in an environmentally safe manner, and disposing of products/materials in an environmentally safe manner.

3.11.1.2 Hazardous Waste

Cannon AFB operates under New Mexico Environment Department (NMED) Identification Number NM7572124454 and is considered a large quantity hazardous waste generator (USAF, 1998). Hazardous Waste is generated primarily from aircraft and vehicle operations and maintenance (hydraulic and lubricating oils and JP-8 jet propulsion fuels), with a smaller amount generated through medical and dental facilities, photographic and x-ray development, craft shops and the Army and Air Force Exchange Service (AAFES) service station (USAF, 1998). Hazardous wastes are accumulated at temporary storage locations, transferred to a 90-day accumulation site, with final deposition at the Defense Reutilization and Marketing Office (DRMO) for off-base disposal (USAF, 1998).

The base is involved in the Installation Restoration Program (IRP) whereby environmentally contaminated areas are identified, characterized, and remediated. At Cannon AFB, all IRP sites are considered to be Solid Waste Management Units (SWMU). No IRP/SWMU sites are located

on or immediately adjacent to **Site 2**; however, the fiber optic route extending north from Site 2 will potentially intersect an area of concern (AOC 7) identified as a site mound. No IRP/SWMU sites are located on or immediately adjacent to **Site 3**; however, the proposed power/telephone route from Site 3 will potentially intersect AOC 7, located approximately 500 feet southwest of the site. Site 3 is also approximately 750 feet southwest of SD-20/SWMU 95, which is an IRP/SWMU site identified in the General Plan as a stormwater drainage area (specifically, NE STORMWATER DRNG AREA; USAF, 1998). No IRP/SWMU sites are located on or immediately adjacent to **Site 4**; however, the proposed fiber optic route will potentially intersect SD-11/SMWU 86-90, which is identified as containing the following constituents: engine test cell (SWMU 86); former overflow pit (SWMU 87); former leaching field (SWMU 88); evaporation pond (SWMU 89); and, an oil/water separator No. 5114 (SWMU 90). No IRP/SWMU sites are located on or immediately adjacent to the existing **AN/GPN-20**.

3.11.2 Future Without the Project

It is anticipated remediation of past hazardous waste sites will continue, as well as management of hazardous materials and newly generated wastes. Continuing pollution prevention measures on the base may reduce potential for new sources of contamination to arise at the alternative ASR-11 sites.

3.12 ELECTROMAGNETIC ENERGY

3.12.1 Existing Conditions

Electrical currents and components generate electrical fields and magnetic fields. These may be stationary or dynamic. Electronic equipment may propagate electromagnetic radiation. Electromagnetic radiation, electrical fields and magnetic fields are localized effects. The electromagnetic environment at a particular location and time is the sum of all the localized electric and magnetic fields plus electromagnetic radiation arriving from both natural and manmade sources. Electric fields, magnetic fields, and electromagnetic radiation are of interest here because of the potential for health effects from some frequency ranges and the potential for electromagnetic interference on other electronic equipment.

Electromagnetic radiation travels at a uniform speed (3×10^8 m/sec in a vacuum; the speed of light). It is often useful to consider electromagnetic radiation as a wave, and to describe it in terms of frequency (where 1 Hertz (Hz) means 1 cycle per second and 1 kHz means 1000 cycles per second). Some parts of the electromagnetic spectrum are more commonly described in terms of wavelength, which is inversely related to frequency.

The spectrum of electromagnetic radiation includes visible light, which has frequencies on the order of 5×10^{14} Hz (specifically, wavelengths from 400 nanometers (nm) to 760 nm). Electromagnetic radiation frequencies higher than those in the spectrum range of visible light include ultraviolet light, X-rays, and gamma-rays. These types of electromagnetic radiation are described as "high energy" and have the potential to "excite" electrons, to thereby ionize molecules, and to thus affect body chemistry. Especially in high absorbed doses, high frequency electromagnetic radiation can adversely affect health (NSC, 1979).

Electromagnetic radiation with frequencies lower than visible light includes infrared light and radio waves. Frequencies below 10^{12} Hz (10^6 MHz) are categorized as radio waves. These include frequencies used for AM radio; short-wave, television, and FM broadcast bands; pagers; cellular telephones; mobile radios; radar; and microwave technologies. These frequencies are non-ionizing, and have the following known health effects: (1) effects caused by directly heating body tissues and (2) electromagnetic interference with electronic medical devices such as pacemakers.

The heating of tissues caused by exposure to radio frequency radiation (RFR) at relatively low incident power densities can normally be accommodated. However, in some tissues, heat produced at higher radiation intensities may exceed temperature regulating mechanisms so compensation for heat gain may be inadequate. Thus, exposure at high intensities can cause thermal distress or irreversible thermal damage. Eye tissues are particularly vulnerable (NSC, 1979).

Existing equipment at the AN/GPN-20 radar emits electromagnetic radiation in the radio frequency range. Locations close to the antenna are considered unsafe when the radar is operating, on the basis of the potential for heating of body tissues. Similarly, the tower

immediately below the antenna is considered unsafe. The intensity of the radar energy diminishes with distance, so there would be less tissue heating at greater distances.

Within electronic systems for radar, any high-voltage tubes capable of emitting X-rays are typically shielded with lead, and shielding on other equipment is typically adequate to limit transmitted radiation to acceptable levels. While there are unshielded components present at the AN/GPN-20 site such as incandescent light bulbs, there is no expectation or indication the present system emits significant levels of electromagnetic radiation other than RFR into the environment.

Given their remote locations, Sites 2, 3 and 4 would be unlikely to contain significant magnetic or electrical fields.

3.12.2 Future Without the Project

Without the project, the future electromagnetic field conditions in the vicinity of the three alternative ASR-11 sites and the existing AN/GPN-20 are expected to remain relatively similar to those currently present.

4.0 SUMMARY OF ANTICIPATED ENVIRONMENTAL IMPACTS

The No Action alternative would leave existing radar system and air traffic control equipment in place. In addition, no new construction, renovation, or operations would be required. Since the no action alternative would involve no alteration to any of the three potential ASR-11 sites at Cannon AFB, this alternative would result in no impact to environmental resources. Thus, the environmental consequences of the No Action alternative would result in identical conditions to those identified in Section 3.0, Future Baseline without the Project. However, selecting the No Action alternative, and thereby having to maintain the existing AN/GPN-20, would require relying on existing radar equipment not capable of meeting future user requirements for transmitting digital signal data to new digital automation system air traffic controller displays. The existing facilities do not meet user requirements for increased target detection, weather reporting, and improved reliability.

The proposed action would involve the construction of a new ASR-11 facility. Potential impacts associated with the action alternative involve those resulting from construction (short-term) and operation (long-term) of the DASR systems. The potential impacts are described in this section for each of the alternative ASR-11 sites (Site 2, Site 3, and Site 4). Impacts are presented by environmental parameter. Section 5.0 describes mitigation measures which may be required to reduce impacts.

4.1 LAND USE

4.1.1 Short-Term Impacts

Short-term impacts associated with the construction of the ASR-11 would include temporary disruption of land uses due to elevated noise levels, increased dust, interference with roadway access, and visual effects. Construction of the ASR-11 facilities would include the installation of a temporary construction staging area approximately 75 feet by 100 feet adjacent to the ASR-11 site. This staging area would be used by construction personnel to store equipment for use during construction of the ASR-11 and would result in a temporary loss of open space near each of the sites. Given the abundant open space surrounding each of the sites, and the fact the loss of

the staging area will be temporary; no significant land use impacts are anticipated to result from the use of a staging area.

Since **Site 2** is within a large area of uninhabited open space, noise and dust impacts are anticipated to be minimal. The electric and telephone connections to Site 2 would extend approximately 1,355 feet from the existing AN/GPN-20. The fiber optic cable would be direct-buried along a 2,100-foot cable run from the site to an existing handhold (23B-8) north of Site 3. These three utility runs cross undeveloped areas of open space, thus, elevated noise levels and increased dust associated with open trench excavation are anticipated to have minimal impact on the adjacent land uses and would be temporary in nature.

Site 3 is located within an area of open space with only one occupied building, the Combat Air Training and Maintenance (CATM) Building, approximately 500 feet to the north. Noise and dust impacts are anticipated to be minimal due to the distance between the site and occupied buildings in the immediate area. Similar to Site 2, the telephone and electric utility routes would extend approximately 1,500 feet across undeveloped open space to the existing AN/GPN-20. The fiber optic cables would be direct-buried and would extend approximately 900 feet north-northwest across undeveloped open space to an existing handhold (23B-8). As with Site 2, the utility alignments for Site 3 would cross areas of open space, thus, the elevated noise levels are anticipated to have minimal impact and would be temporary in nature.

Site 4 is just north of Afterburner Road (Fire Training Area Access Road) within a large area of open space with no occupied buildings nearby. Due to the lack of occupied buildings in the immediate area, if Site 4 were chosen as the preferred site for the ASR-11, the noise and dust during the construction phase would result in a minor impact. The noise and dust is not anticipated to significantly impact the paintball field located 200 feet to the south of the site. The electric and telephone lines would extend approximately 2,500 feet west along Afterburner Road to the fire training area. The fiber optic cables would extend approximately 2,400 feet west across open space to the existing handhold (23B-9) located in an area designated as airfield operation land use. Land uses along the utility alignments for Site 4 could be affected by elevated noise levels and increased dust associated with open trench excavation; however, these impacts would be minimal and temporary in nature.

Upon the successful completion of the construction of the ASR-11, the existing **AN/GPN-20** radar would be dismantled. Impacts to surrounding land uses related to the removal of the AN/GPN-20, including increases in noise and dust would be minimal due to the short duration of the dismantling activities and the fact the radar is surrounded by undeveloped areas.

4.1.2 Long-Term Impacts

Each of the three candidate sites is located within a large expanse of open space. The Cannon AFB Community Planner (27 CES/CECP) has indicated operation of an ASR-11 at any one of the three candidate sites (**Site 2, Site 3,** or **Site 4**) would be consistent with the land use designation of open space (USAF, 2004b). However, a change in land use designation of the final site of the ASR-11 may follow its construction (USAF, 2004b).

Removal of the existing **AN/GPN-20** is not anticipated to result in any long-term land use impacts. Following demolition/disassembly of the AN/GPN-20, the land where the existing radar is presently located could be reclaimed by Cannon AFB for purposes consistent with its setting and open space land use designation.

4.2 SOCIOECONOMIC CONDITIONS

4.2.1 Short-term Impacts

Construction of the ASR-11 at any of the three alternative sites would require similar work efforts, and would, therefore, have similar effects on socioeconomic conditions at the base and the surrounding area. Construction at **Site 2, Site 3**, or **Site 4** would not adversely impact the socioeconomic conditions at Cannon AFB. A slight short-term increase in the revenue generated in the surrounding area may occur due to construction employees utilizing local businesses for supplies and personal use. During the construction period, the work crew would consist of approximately 10 people.

Upon successful completion of the construction of the ASR-11, the **existing AN/GPN-20** radar would be dismantled and packed for shipment and possible reuse at another location. No effects on socioeconomic conditions are anticipated as a result of this activity.

4.2.2 Long-term Impacts

In the absence of other independent activities at Cannon AFB, socioeconomic conditions would return to the existing conditions once radar construction is completed. The new radar facility would not be staffed, and would therefore have no long-term effects on socioeconomic conditions.

4.2.3 Environmental Justice

Under its instructions for the Environmental Impact Analysis Process (32 CFR Part 989), the Air Force must demonstrate compliance with Executive Order 12898, entitled *Federal Actions to Address Environmental Justice in Minority Populations and Low Income Populations*, to determine the effects of federal programs, policies, and activities on minority and low income populations.

Census tract 9 block group 9 (BG 9), which comprises Cannon AFB, is characterized by a percentage of persons (8.4 percent) living below the poverty level which is lower than the city, county, or state averages (Table 3.2-1). BG 9 is also characterized by a higher black population than the block group encircling the base (census tract 6 block group 4). However, the total percentage of minority populations within BG 9 is lower than the city, county, and state percentages.

In order for there to be a potential environmental justice impact, a unique low-income or minority population must be present, as well as a significant adverse impact. As described above, the block groups in the vicinity of, and containing, Cannon AFB do not appear to contain unique populations with respect to poverty or ethnicity. Furthermore, as described throughout Section 4.0, the proposed DASR installation is not expected to have significant human health or

environmental impacts. Therefore, the proposed project is consistent with the objectives of Executive Order 12898.

4.3 UTILITIES AND TRANSPORTATION

The following describes potential short- and long-term effects to utilities as a result of the installation of the DASR system.

4.3.1 Short-term Impacts

Various lengths of open trench excavation would be needed to provide utility connections, such as fiber optic cables (Table 4.3-1), depending on the site chosen. Construction of the ASR-11 will require limited water and wastewater service.

Table 4.3-1 Required Lengths of New Utility Connections and Access Roads

ASR-11 Alternative Site	Length of New Access Road Required	Length of Electric Power Line Required[3]	Length of Telephone Cable Required	Length of Fiber Optic Cable Required
Site 2	0 feet	1,355 feet	1,355 feet	2,100 feet[1]
Site 3	50 feet	1,500 feet	1,500 feet	600 feet[1]
Site 4	100 feet	2,500 feet	2,500 feet	2,400 feet[2]

1. New direct bury conduit will be installed between proposed site and Handhole 23B-8.
2. New direct bury conduit will be installed between proposed site and Handhole 23B-9.
3. Electric lines would be installed aboveground.

Source: USAF, 2003a.

4.3.1.1 Water Supply

A temporary increase in water demand would occur during construction. A water source would be supplied on site by mobile water tanks. Due to the limited number of construction workers, short construction period, and the adequate supply of water to the base, it is not anticipated the water demand both for workers' personal need and dust control during construction of the ASR-11 or dismantling of the AN/GPN-20 would adversely impact the water supply at Cannon AFB.

4.3.1.2 Wastewater Treatment

There would be an insignificant short-term increase in demand for sewage treatment during construction. Portable toilets would be available during the construction, and waste would be transported to the Clovis NM Wastewater Treatment Facility for proper disposal.

4.3.1.3 Solid Waste

As the existing AN/GPN-20 is dismantled, material not suitable for reuse or recycling would be removed. All solid waste would be handled in accordance with standard base procedures and the Pollution Prevention Plan. As required by Cannon AFB, a solid waste management plan to divert wastes away from the landfill, where possible, would be created prior to the commencement of construction (USAF, 2003d). Any hazardous materials would be disposed of following Cannon AFB policies and protocols and relevant state and federal regulations (see Section 4.11 on hazardous waste).

4.3.1.4 Electricity

Adequate electrical power is available to each of the alternative ASR-11 sites. Power would be provided to Site 2, Site 3, and Site 4 through overhead lines at a length of 1,355 feet, 1,500 feet, and 2,500 feet, respectively (USAF, 2003a). Short-term disruption of power to the immediate area around the alternative ASR-11 sites may occur while connections are made. Existing electrical lines associated with the AN/GPN-20 would be cut off/capped at or close to ground level.

4.3.1.5 Telephone

Telephone lines would be extended from the existing locations identified in Section 3.3.1.5. While the final route and distance to the new ASR-11 site will be determined during final site design, telephone line connections for Sites 2, 3, and 4 should coincide with the power line connections mentioned in the preceding section. For Sites 2 and 3, power and telephone lines would extend from the existing lines currently service the existing AN/GPN-20. For Site 4, power/telephone lines would extend from existing lines in the Fire Training Area, (USAF, 2003a). No disruption to telephone service in the immediate area of the alternative ASR-11 sites

is expected. Existing telephone lines associated with the AN/GPN-20 would be cut off/capped at or close to ground level.

4.3.1.6 Fiber Optic Cable

The fiber optic connection for Sites 2 and 3 would consist of the installation of direct bury fiber optic cable between the sites and existing fiber optic cabling accessed via handhole 23B-8 (2,100 feet for Site 2 and 600 feet for Site 3; Figure 4-1 and 4-2). For Site 4, the fiber optic connection (a distance of 2,400 feet) would be made between the site and handhole 23B-9 (Figure 4-3). Existing fiber optic connections associated with the AN/GPN-20 would be cut off/capped at or close to ground level.

4.3.1.7 Natural Gas

Natural gas is not required for the proposed ASR-11 radar. Therefore, no impacts are expected to occur with regard to natural gas on Cannon AFB. Utility trenching for electric, telephone, and fiber optic connections are not anticipated to impact existing natural gas lines. However, the location of natural gas lines in the vicinity of all utility connections should be confirmed prior to construction.

4.3.1.8 Transportation

Impacts to transportation systems at/near Cannon AFB during construction would be minimal. Increased activity in the vicinity of the ASR-11 site, including connection of the ASR-11 to existing utilities, could temporarily disrupt local traffic. Personal and commercial vehicles operated by the contractor and subcontractors would be on site or at an area designated by the Air Force. There would be a period of approximately 10 hours when cement trucks would access the site for the foundation placement. The foundation concrete must be placed continuously, thus necessitating the 10-hour period. The types of construction vehicles used for the construction of the ASR-11 and dismantling of the AN/GPN-20 are not anticipated to be

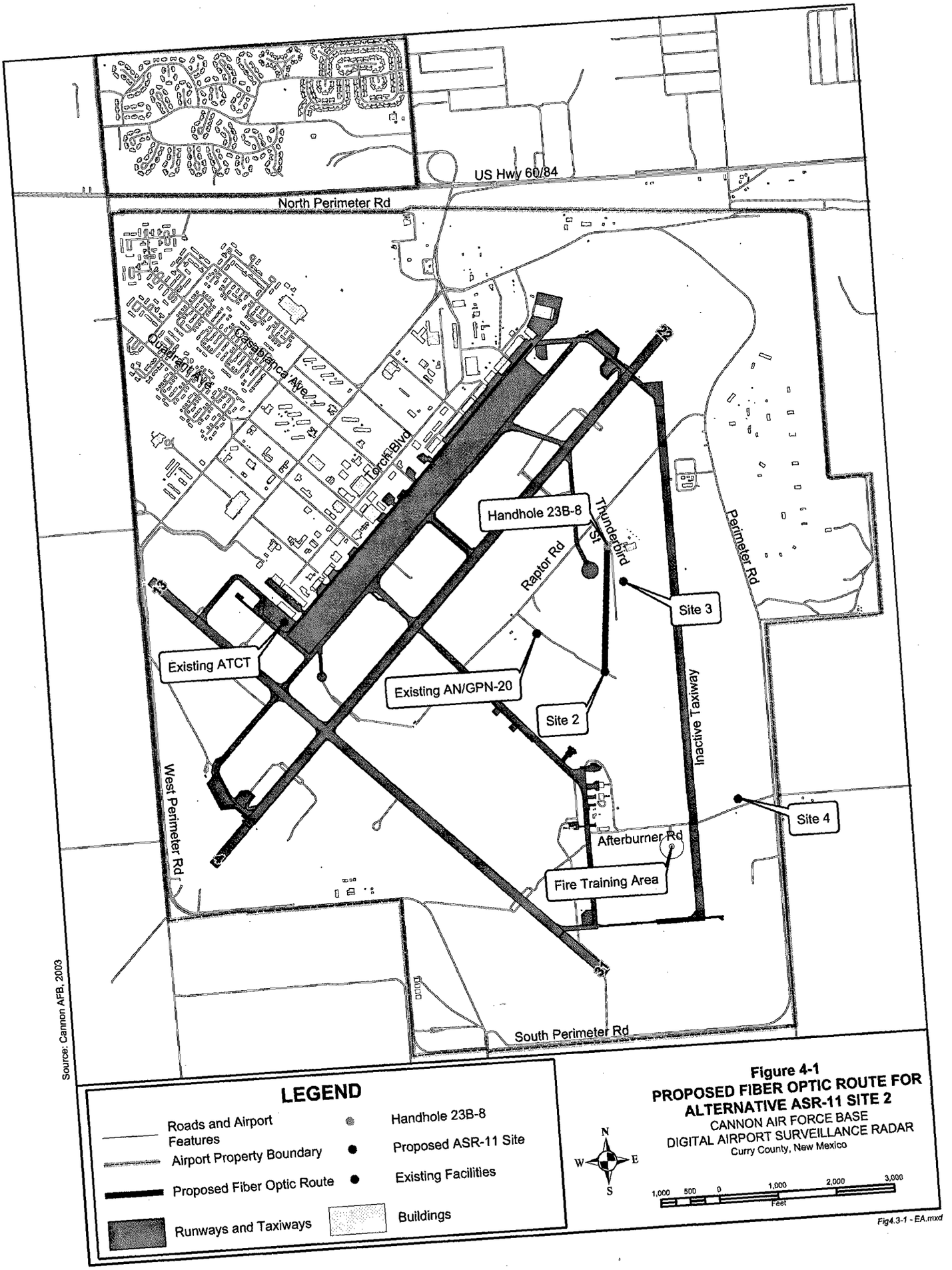


Figure 4-1
PROPOSED FIBER OPTIC ROUTE FOR ALTERNATIVE ASR-11 SITE 2
CANNON AIR FORCE BASE
DIGITAL AIRPORT SURVEILLANCE RADAR
Curry County, New Mexico

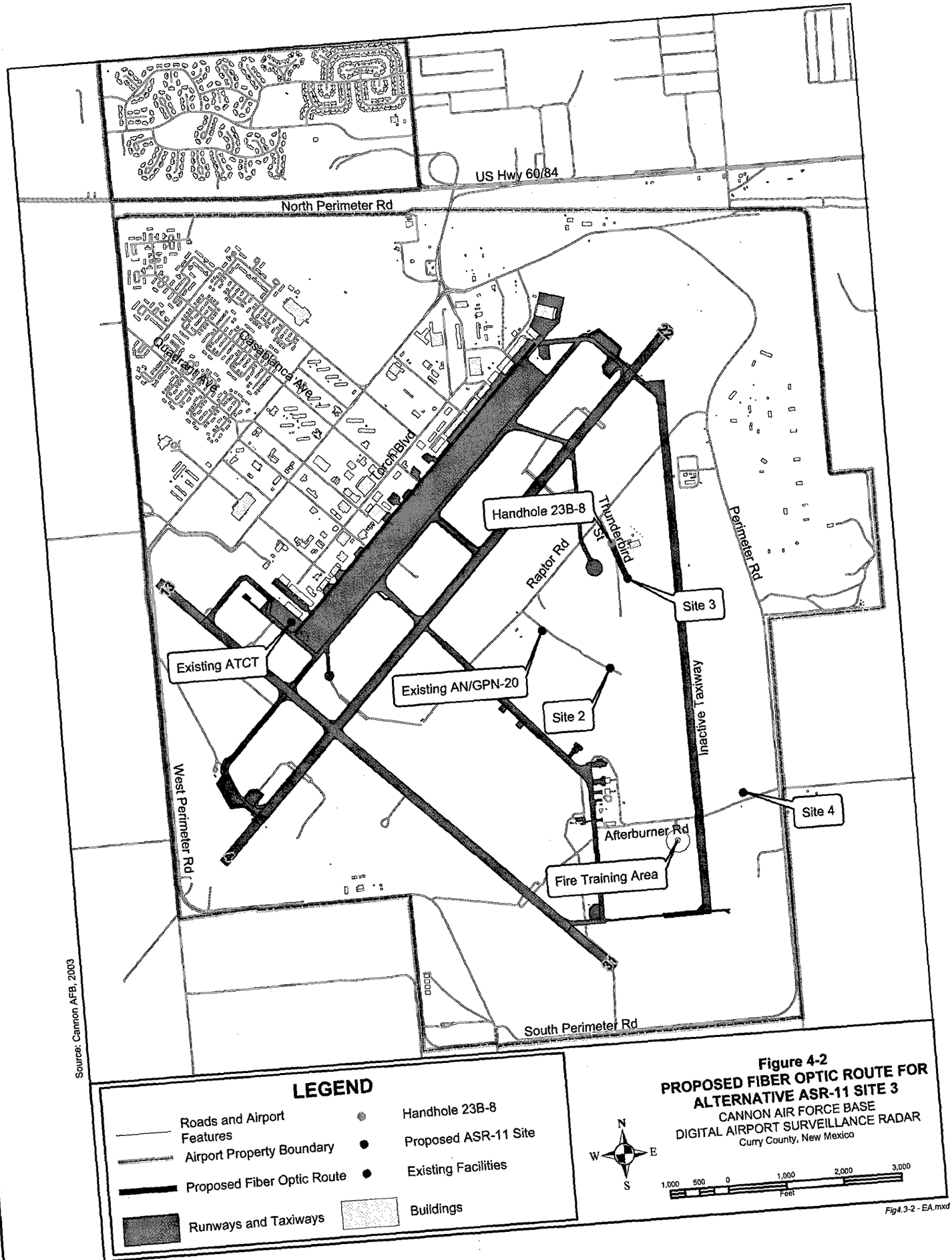
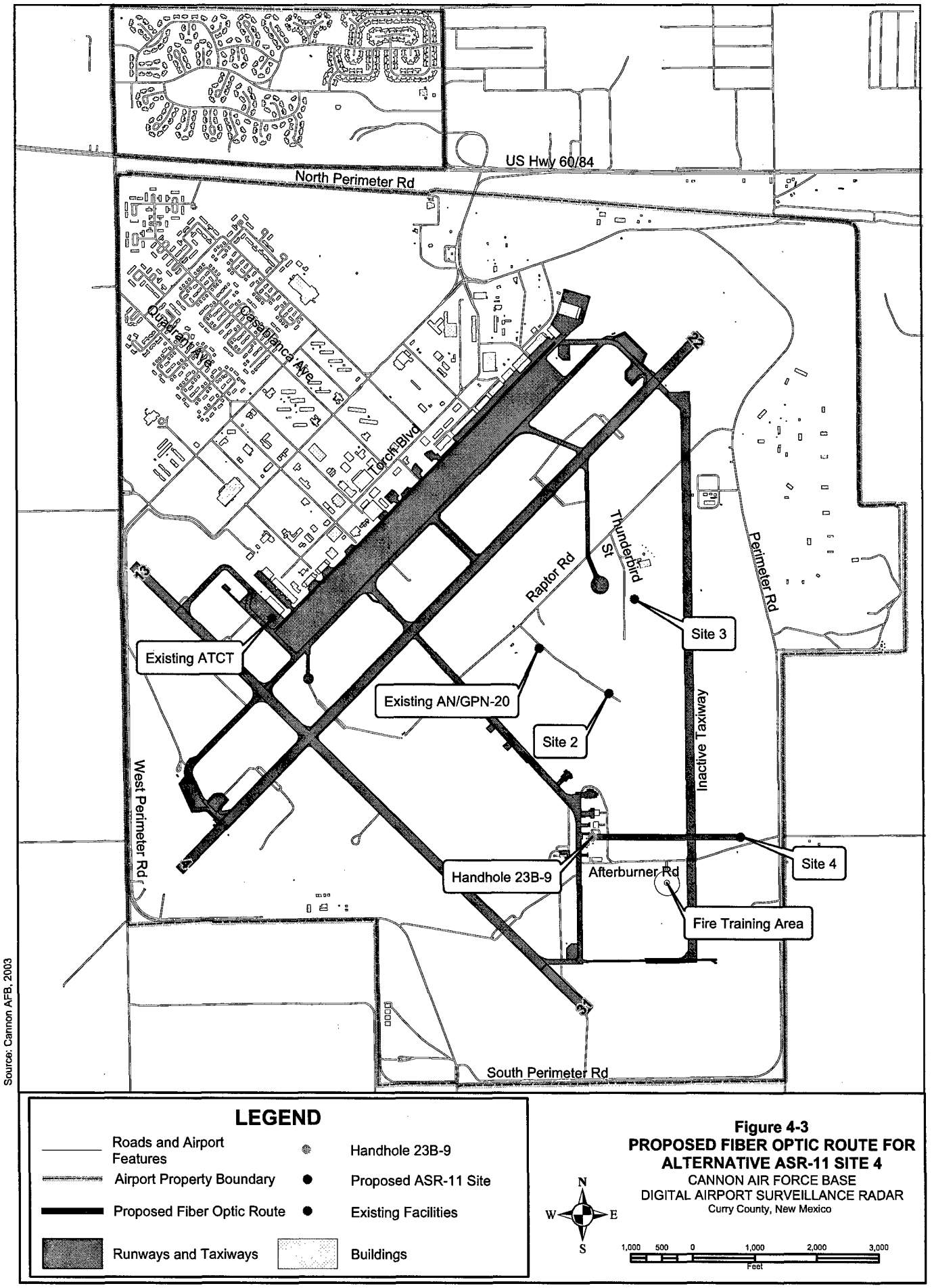


Figure 4-2
PROPOSED FIBER OPTIC ROUTE FOR ALTERNATIVE ASR-11 SITE 3
CANNON AIR FORCE BASE
DIGITAL AIRPORT SURVEILLANCE RADAR
Curry County, New Mexico



Source: Cannon AFB, 2003

Figure 4-3
PROPOSED FIBER OPTIC ROUTE FOR ALTERNATIVE ASR-11 SITE 4
CANNON AIR FORCE BASE
DIGITAL AIRPORT SURVEILLANCE RADAR
Curry County, New Mexico

Fig4.3-3 - EA.mxd

different from those used for other base construction projects. Therefore, the cement trucks and other construction vehicles necessary for construction are not expected to have an impact on base roads.

Site 2 would not require a new access road. However, Site 3 would require a new unpaved access road extending east 50 feet from Thunderbird Street and Site 4 would require approximately 100 feet of new unpaved access road roadway, extending north from Afterburner Road.

4.3.2 Long-term Impacts

It is not anticipated future utility conditions at Cannon AFB would be affected as a result of operating the proposed ASR-11 radar system. The addition of electrical power, telephone lines, and fiber optic cable at any of the alternative radar sites would not have a significant effect on the utilities in the area. The operation of the ASR-11 radar system would not require water, wastewater treatment, or natural gas; therefore, no impacts to those utilities are anticipated. The operation of the DASR would generate a minimal amount of solid waste. The long-term operation of the ASR-11 facility is not expected to have an adverse effect on traffic or transportation.

Discontinuing the operations at the existing AN/GPN-20 radar is not expected to affect area utilities or transportation.

4.4 NOISE

4.4.1 Short-Term Impacts

Construction of the radar tower and supporting infrastructure, including connections to power and telephone, and installation of the fiber optic cable, would result in elevated noise levels as grading and minor excavation occur, and as construction of the tower proceeds. These elevated noise levels, which would be short-term in duration, are not likely to disrupt activities in the vicinity of **Sites 2 or 3** since this area is located within an undeveloped field. Noise impacts during construction at **Site 4** are also anticipated to be minimal and of short duration; however,

users of the nearby paintball field may experience short-term construction-related disturbance. Typical construction equipment noise levels may be reduced by using well-maintained equipment and by installing mufflers and engine jackets. Construction of the towers and supporting infrastructure is anticipated to take five months. Peak noise associated with the tower construction is expected to last approximately three weeks; however, construction noise should be expected throughout the five-month duration.

Dismantling of the existing **AN/GPN-20** could result in localized, temporary elevation of noise levels. However, due to the existing noise levels, which are strongly influenced by the proximity to the flightline, and the expected short duration of the dismantling activity, noise impacts are expected to be minimal.

4.4.2 Long-Term Impacts

No long-term noise impacts are anticipated to result from operation of the proposed ASR-11 radar. Noise levels generated by the ASR-11 would be maintained at a level consistent with current Occupational Safety and Health Administration (OSHA) regulations as specified in CFR Title 29, Part 1910. Noise from ASR-11 equipment is not anticipated to exceed 55 decibels outdoors on the ground at a distance of 100 feet from the tower, with the exception of the emergency generator, which may emit up to 65 dB when operating. As described in Section 3.4.1, **Site 2** is located within the 70 to 75 dB contours; **Site 3** is located within the 75 to 80 dB contours; and **Site 4** is located in the under 65 dB contour (USAF, 1998). Therefore, the contribution to noise in the surrounding areas is expected to be consistent with the persistent nature of existing noise produced from the proximate aircraft operations. Dismantling the existing AN/GPN-20 would result in the cessation of noise produced from the operating equipment including the periodic operation of the emergency generator.

4.5 AIR QUALITY

The Clean Air Act requires actions of federal agencies or federally supported activities to not: 1) cause or contribute to any new air quality standard violation; 2) increase the frequency or

severity of any existing standard violation; or 3) delay the timely attainment of any standard or any required interim emission reductions or other milestones.

4.5.1 Short-term Impacts

The short-term air quality impacts of constructing an ASR-11 would be localized at all of the three alternative sites. Construction vehicle operation and traffic would generate fugitive dust during the construction of access roads, utility trenches, and the tower and supporting buildings. Due to potential for prolonged dry weather, a dust suppressant should be applied to the site during the construction activities. The disturbed area at any of the three ASR-11 alternative sites would be variable, proportional to the amount of utility trenching and access road construction (see Section 4.3).

All construction vehicles and some equipment would produce engine emissions which could temporarily affect air quality. However, because the number of vehicles and duration of construction required to perform the work is limited, emissions are not anticipated to cause an exceedance of NAAQS or New Mexico AAQS in the vicinity of the selected ASR-11 radar site.

Dismantling of the existing AN/GPN-20 radar would generate some fugitive dust and some vehicle and equipment emissions. The nominal emissions and dust generated during the AN/GPN-20 dismantling are not anticipated to cause an exceedence of either the federal or state air quality standards.

4.5.2 Long-term Impacts

Operation of the ASR-11 radar at any of the three alternative sites would produce identical emissions, and is not anticipated to have adverse impacts on air quality. Sources of emissions during the operation of the ASR-11 would include the periodic operation of the emergency diesel generator at the ASR-11 site, and evaporative loss of fuel from the AST. The emergency generator is anticipated to be operated approximately once a month for testing and during occasional power outages. The emissions from operation of the generator and evaporative loss from the associated AST are expected to be minimal and to have no adverse impact on air

quality. At any of the three alternative sites, minimal fugitive dust is expected to be generated by maintenance vehicles.

The emergency generator and fuel tank would need to be added to the Cannon AFB "synthetic minor" air quality permit. Although the proposed generator would likely be more efficient than the existing generator at the AN/GPN-20 site, the proposed generator (135 kW) would be larger than the existing generator (50 kW), thereby offsetting some of the emissions reductions which would be achieved by improved efficiency. Similarly, although the existing 100-gallon AST at the AN/GPN-20 site would be removed, the proposed AST (1,000 gallons) for the ASR-11 is larger, and thus could result in a slight net increase in evaporative emissions (depending on the vapor pressure of the stored fuel).

4.6 GEOLOGY AND SOILS

4.6.1 Short-Term Impacts

The construction of the ASR-11 radar system would have similar effects on soil at each of the alternative ASR-11 sites. Excavation for the footings of the radar tower is not anticipated to exceed seven to eight feet in depth. Excavation for the utility trenches is typically four feet deep, and may be up to 10 feet wide. The temporary construction staging area would be restored upon project completion and would not be anticipated to substantially impact geology or soils. The dismantling of the AN/GPN-20 would not require any ground disturbance; therefore, there would be no impact to the soil or geology from dismantling.

4.6.2 Long-Term Impacts

No long-term impacts to the existing soils or geology are anticipated if the ASR-11 were operated at any of the alternative sites. Similarly, dismantling of the existing AN/GPN-20 is not anticipated to result in any long-term impact to the existing soils or geology.

4.7 SURFACE AND GROUNDWATER

4.7.1 Short-Term Impacts

There are no surface water bodies in close proximity to the alternative ASR-11 sites. Therefore, the temporary construction activities at any of the three sites, or at the AN/GPN-20, are not anticipated to result in stormwater runoff impacts to surface water. Soil disturbance is anticipated to be less than one acre regardless of the site chosen; therefore, no stormwater discharge permit would be required. During construction, all activities will follow the base best management practices (BMP) guidelines. Depth to groundwater throughout the base is approximately 280 feet below ground surface. Trenching and construction of radar tower footings (approximately seven to eight feet deep) at any of the three alternative ASR-11 sites are not anticipated to intersect the groundwater table. In addition, the dismantling of the AN/GPN-20 would not require ground disturbance.

4.7.2 Long-Term Impacts

There would be no significant long-term impact to surface water if the ASR-11 were to be constructed and operated at any of the three alternative sites. Only if Site 4 were chosen would there be a remote chance of discharging stormwater runoff to the waters of the U.S. (USAF, 2003d). However, site disturbance is anticipated to be less than one acre, regardless of the site selected; therefore, no stormwater permit would be required. Final design of the DASR facility will accommodate surface drainage. There would be minimal change in stormwater runoff at any of the three sites and along access roads. Removal of the AN/GPN-20 is not anticipated to have an impact on stormwater runoff on the base.

Similarly, no long-term impacts to the groundwater are anticipated to result from the operation of an ASR-11 at any of the three alternative sites. Underground utility conduits will not interfere with groundwater given the great distance between utilities and the groundwater elevation. Removal of the AN/GPN-20 is not expected to have an impact on groundwater.

4.8 BIOLOGICAL RESOURCES

4.8.1 Short-Term Impacts

The short-term impacts of installing an ASR-11 would be relatively similar at **Sites 2, 3,** and **4.** These impacts are described below for each of the biological resource parameters.

4.8.1.1 Vegetation

The construction of the ASR-11 includes the installation of the antenna foundation and tower, utilization of a temporary construction staging area, and other site improvements and grading. This activity will require the clearing of vegetation in the immediate areas of the facility, within the temporary construction staging area, and within the corridor of the utilities and access roads, where applicable. The total area of the DASR facility site is approximately 0.59 acres excluding the area of temporary disturbance along the utility roadway routes. Site 2 would not require the construction of a new access road, as the existing dirt access track would be utilized. If Site 3 were chosen, a 16-foot wide and 50-foot long access road would be required to be cleared from Thunderbird Street. If Site 4 were chosen, a 16-foot wide and 100-foot long access road would be required to be cleared from Afterburner Road. Given this relatively small area to be cleared, regardless of the site chosen, the construction of the DASR facility is not anticipated to present a significant impact to vegetative communities on, or in the vicinity of, Cannon AFB.

4.8.1.2 Wetlands

As noted in Section 3.8.1.2, there are no identified wetlands in the immediate vicinity of any of the alternative ASR-11 sites or the existing AN/GPN-20. Therefore, the proposed project is not anticipated to impact wetlands.

4.8.1.3 Wildlife

Due to the relatively limited area proposed for disturbance, the construction of the ASR-11 facility or the dismantling of the AN/GPN-20 is not anticipated to substantially impact wildlife in the area. Wildlife populations found on any of the alternative ASR-11 sites, or near the existing radar, are likely to be accustomed to periodic noise intrusions because of the persistent nature of

the airfield operations. Some brief displacement of wildlife populations may occur in the area of each site during construction.

4.8.1.4 Threatened and Endangered Species

As noted in Section 3.8.1.3, there are no known federal- or state-listed threatened or endangered species present within or adjacent to the alternative ASR-11 sites or the existing AN/GPN-20 at Cannon AFB. Therefore, the proposed project is not anticipated to impact threatened and/or endangered species.

4.8.2 Long-Term Impacts

Operation of the ASR-11 at any of the three alternative sites has limited potential to result in long-term impacts on biological resources, as noted below.

4.8.2.1 Vegetation

The ASR-11 facility would be within a 140-foot by 140-foot area (0.45 acres within the site fence, which does not include the adjacent grading areas), in which vegetation would not be able to grow, due either to the presence of structures or the geotextile membrane/gravel surface treatment within the fenced area. Vegetation would also be precluded from growing within the proposed access roads (covering between 0.02 and 0.04 acres, depending on the site chosen). However, vegetation would be re-established, by seeding with a native grass mix, within the 7,500 square foot temporary construction staging area, and the areas graded outside of the site fence and along the utility routes which pass through vegetated areas. The dismantling, and subsequent removal, of the existing AN/GPN-20 is not anticipated to substantially impact vegetation. Given the limited size of the project area, the loss of some vegetation is not anticipated to substantially impact the biological community on, or in the vicinity of, the selected site.

4.8.2.2 Wetlands

Due to the absence of wetlands from the proposed ASR-11 sites and the existing AN/GPN-20, no long-term impacts to wetlands are anticipated.

4.8.2.3 Wildlife

Given the relatively small area required for the DASR facility, the presence and operation of a DASR system should not interfere with wildlife. The ASR-11 tower could theoretically pose an obstacle to birds flying through the area of the site. However, as discussed in the Programmatic EA for the NAS program (USAF, 1995a), the relatively low height of the ASR-11 antenna is not anticipated to pose a substantial threat to birds flying through the area. Dismantling of the existing AN/GPN-20 is not anticipated to adversely affect extant wildlife.

4.8.2.4 Threatened and Endangered Species

No threatened or endangered species are expected to be encountered at any of the alternative ASR-11 site locations or the existing AN/GPN-20; therefore no impacts are anticipated to result from radar operation.

4.9 AESTHETICS

4.9.1 Short-Term Impacts

In general, the aesthetic values of **Sites 2, 3,** and **4** are linked to the military function of the base. Vehicles rarely pass through the area of Site 2 as only dirt access roads extend into this area. Site 3 is located considerably closer to the active runways on Cannon AFB and the CATM building is also nearby, making this site less isolated than Site 2. Site 4 is located near the base boundary adjacent to a paved roadway. Due to a short construction period and the small area in which staging and installation would be located, no significant aesthetic impacts are anticipated at any of the three alternative sites. The location of the **AN/GPN-20** is also within an area of military activities; therefore, dismantling of this facility is not anticipated to adversely affect the aesthetic resources of the area.

4.9.2 Long-Term Impacts

Site 2 and **Site 3** are located in the same general location as the existing AN/GPN-20 and the active taxiways and runways at Cannon AFB. Although the ASR-11 would represent a change

in the existing landscape immediately surrounding these two sites, the long-term presence and operation of the ASR-11 in these locations would be consistent with the aesthetic military character of the area. **Site 4** is located closer to the base boundary and further from the existing AN/GPN-20 and the taxiways/runways; however, the site is closer to the airfield operation and maintenance area located to the west along Afterburner Road. There are two private residences located approximately 1,200 feet south-southeast from the proposed site and a paintball field located 200 feet to the south. The area is currently open space with very few vertical elements in the landscape; thus, placement of a radar facility at Site 4 could potentially result in an aesthetic impact.

4.10 CULTURAL RESOURCES

4.10.1 Short-Term Impacts

A letter was sent to the New Mexico Department of Cultural Affairs Historic Preservation Division to request information as to whether the project would affect any cultural resources. At the direction of the New Mexico State Historic Preservation Officer (SHPO), letters were also sent to three Indian tribes which may be interested in the proposed radar at Cannon AFB: Apache Tribe of Oklahoma, Comanche Indian Tribe, and Kiowa Tribe of Oklahoma. A response from only one of the tribes (Comanche Tribe NAGPRA) was received. The response requested if, during the construction period, any archaeological materials are exposed, all activities are halted and the Comanche Nation be notified. A response from the New Mexico SHPO dated July 2, 2003 was received indicating "No Historic Properties Affected" (see Appendix A). Based on this correspondence and cultural resource surveys for Cannon AFB, neither the construction activities associated with the installation of the ASR-11 nor the dismantling of the existing AN/GPN-20 is anticipated to impact any cultural resources. In addition, trenching required for utility connections at any of the three potential ASR-11 sites is not anticipated to impact cultural resources, based on the current knowledge of the locations of such resources. If cultural resources are discovered during construction or demolition, work will cease immediately and notification of all appropriate parties shall occur within twenty four (24) hours. Protection of the resources will be the primary concern and continuation of work shall not take place until requirements of all applicable regulations are met.

4.10.2 Long-Term Impacts

Since no cultural resources are known to exist at any of the three alternative sites or the existing AN/GPN-20, no long-term impacts to cultural resources are anticipated to result from the operation of the ASR-11 or the dismantling of the AN/GPN-20.

4.11 POLLUTION PREVENTION AND HAZARDOUS WASTE

4.11.1 Short-Term Impacts

Construction of the ASR-11 radar system would comply with applicable Cannon AFB policies and guidelines for pollution prevention. In addition, a pollution prevention plan has been developed for the NAS program. This plan prohibits the use of all Class I ozone depleting chemicals and directs the contractor to minimize the use of Class II ozone-depleting chemicals and toxic substances. These requirements are applicable regardless of whether Site 2, Site 3 or Site 4 is chosen. Consequently, hazardous waste generation would be avoided to the maximum extent possible during construction of the radar facility and the dismantling of the existing AN/GPN-20 facility. During earth work, if asbestos pipe associated with the old runway drainage system is uncovered, the contractor is advised to contact the Cannon AFB Environmental office (27 CES/CEVC) and not disturb the piping.

At each of the three alternative ASR-11 sites, some hazardous materials and waste would likely be used and generated during the ASR-11 construction, including: equipment fuel, engine oil, hydraulic oil, grease, and other equipment operation and maintenance material. Refueling of equipment may also take place at the alternative ASR-11 site selected for construction. Any hazardous materials used during ASR-11 construction would be used, stored, transported, and disposed in accordance with base, military, state, and federal regulations. The proposed route for fiber optic and power/telephone connections for **Site 2** and **Site 3**, respectively, may intersect AOC 7, a site mound. Cannon AFB personnel have indicated no construction may occur within the boundaries of this site, thus any utility route in the area must be directed around the area of contamination (USAF, 2004c). The proposed fiber optic route for **Site 4** could potentially pass

through SD-11/SWMU 86-90, as described in Chapter 3. Cannon AFB personnel have indicated no construction may occur within this designated area (USAF, 2004c). The Preliminary Design for the remediation of this site is anticipated to begin in 2004. Once the site has been remediated, a new facility will be located on the site; thus construction will be required to avert the area both before and after the contamination has been remediated.

The existing **AN/GPN-20** radar may have been painted with lead paint. The AN/GPN-20 would be dismantled and transported off-site. The contractor would be required to separately and properly package, mark, and dispose of hazardous materials encountered during the dismantling of the AN/GPN-20 and facilities equipment. Small pieces of lead paint may chip off of the AN/GPN-20 radar during the dismantling process; however, substantial amounts of lead paint would not be left on site as a consequence of the decommissioning of the radar. As part of the dismantling, the area would be surveyed prior to final site decommissioning, and, if present, lead paint chips would be collected and disposed of in accordance with applicable Cannon AFB policies and procedures.

4.11.2 Long-Term Impacts

The potential long-term pollution and hazardous waste impacts resulting from operation of the ASR-11 are discussed in the following sections. No pollution and hazardous waste impacts are anticipated to result from the dismantling of the existing AN/GPN-20.

As indicated above, the NAS program has a pollution prevention plan, which prohibits the use of all Class I ozone-depleting chemicals, and directs the contractor to minimize the use of Class II ozone-depleting chemicals and toxic substances. In addition, operation of the ASR-11 system would comply with all applicable Cannon AFB policies and guidelines for pollution prevention. Consequently, hazardous waste generation is anticipated to be reduced to the maximum extent possible during the operation of the ASR-11 facility.

Operation of the radar facility at any of the three alternative sites would include the installation of a 1,000-gallon AST for the storage of diesel fuel to be used for emergency power generation. The fuel tank would be affixed with the National Fire Protection Agency Fire Diamond label to

indicate the presence of hazardous material/chemicals. Since the tank would hold less than 1,320 gallons, it would not be regulated by the state, but would comply with all federal and base spill control requirements, including a leak detention system, overfill alarm, and double-wall and/or secondary containment as specified in 40 CFR 112.

In addition, hazardous materials and waste would likely be used and generated during operation, including: equipment fuel, engine oil, hydraulic oil, grease, and other equipment operation and maintenance material. All hazardous materials and waste would be used and disposed of in accordance with applicable regulations and base policies. Consequently, it is not anticipated any soil or groundwater contamination would occur as a result of operating the radar at any of the alternative sites.

4.12 ELECTROMAGNETIC ENERGY

4.12.1 Short-Term Impacts

Construction at any of the ASR-11 alternative sites on Cannon AFB would not be expected to generate radio frequency radiation (RFR) at levels harmful to human health. Some low levels of RFR could be generated from commonly used devices at construction sites, such as cellular telephones or portable computers. However, any RFR or other electric or magnetic fields generated would be typical of those which exist throughout the developed human environment and are not anticipated to be harmful to human health.

Dismantling of the existing AN/GPN-20 would occur only after its operation had ceased. Consequently, there should be no RFR hazard to workers involved in the AN/GPN-20 dismantling. Similar to the ASR-11 construction, dismantling activities at the AN/GPN-20 site could generate low levels of RFR from commonly-used devices; however, these are not anticipated to be harmful to human health.

4.12.2 Long-Term Impacts

Operation of the ASR-11 radar at any of the three alternative sites would generate identical levels of electric and magnetic fields, including RFR. As discussed in Section 3.12, the RFR generated by the existing AN/GPN-20 is only hazardous at close distances to the radar when it is operating. Similarly, the RFR generated by the ASR-11 would only be hazardous at close ranges, while the radar is operating (see below). The tower immediately below the radar would be in the spillover region, and would be hazardous to humans during radar operation. At any of the three alternative sites, the facility would be sited a sufficient distance from occupied buildings and recreational areas, including the paintball field near Site 4, and radar operation would not pose a RFR hazard to personnel within the general vicinity of any of the ASR-11 sites. To advise personnel in the area of the RFR hazard at close ranges, the perimeter of the ASR-11 facility would be posted with signs warning against approaching the antenna while it is in operation. When the antenna is not in operation, no RFR would be generated, and therefore no RFR hazard would exist.

The American National Standards Institute/Institute of Electrical and Electronics Engineers (ANSI/IEEE) maximum permissible exposure (MPE) levels for the ASR-11 frequency is 1.80 mW/cm^2 to 1.93 mW/cm^2, averaged over 30 minutes in uncontrolled environments (ANSI, 1992). Since access to the base is restricted and RFR exposure would be occupational in nature (i.e. a controlled environment), the ANSI/IEEE MPE of 9.00 mW/cm^2 to 9.67 mW/cm^2 averaged over six minutes for controlled environments is a more appropriate standard. The average power density of the ASR-11 signal decreases with distance from the antenna.

Testing of RFR levels has been undertaken at several of the DoD or FAA sites at which the ASR-11s have been installed. Test data from Stockton Municipal Airport (California) show power density measured in the direct line of a non-rotating radar beam dissipates to below 9.00 mW/cm^2 to 9.67 mW/cm^2 at approximately 90 feet from the antenna (738th Engineering Installation Squadron, 2002). When out of the direct line of a non-rotating radar beam, power density values drop more quickly. At a distance of 54 feet from the antenna and 35 feet below the antenna, power density dissipates to less than 0.01 mW/cm^2. Power density values would decrease further when the antenna and beam are rotating (738th Engineering Installation Squadron, 2002). Additional testing at Luke AFB suggests the highest RFR emission level

reading in the vicinity of the tower was 0.028 mW/cm^2, measured in the pedestal room entrance just below the antenna while the antenna was rotating (ESC, 2004a). Since the focal point of the ASR-11 at Cannon AFB would be 65 feet (approximately 20 meters) above ground level, and the antenna would emit RFR only when rotating, persons standing on the ground below the radar focal point would not be expected to be exposed to RFR levels exceeding the ANSI/IEEE MPE of 9.00 mW/cm^2 to 9.67 mW/cm^2. Furthermore, during the final site acceptance test, RFR measurements will be made in and around the equipment shelter, at the base of the tower, and inside the pedestal room directly below the antenna. The U.S. Air Force will not approve the facility unless the RFR is below the ANSI/IEEE MPE (ESC, 2004b).

5.0 MITIGATION MEASURES

Impacts occurring at any of the sites during construction and operation of the DASR system are minor in nature and few mitigation measures would be required. To minimize noise impacts during construction, mufflers would be used on construction equipment and vehicles. In addition, all equipment and vehicles used during construction would be maintained in good operating condition so emissions are minimized, thus reducing the potential for air quality impacts. Dust will be controlled on-site by using water to wet down disturbed areas. The small area to be permanently cleared for the DASR facilities would be stabilized using geotextile fabric with gravel, to minimize the potential for erosion. The temporary construction activities at any of the three alternative sites are not anticipated to impact stormwater runoff; however, during construction, all activities would follow the base best management practices to minimize sedimentation and erosion during storm events. In addition, all other areas disturbed outside of the ASR-11 facility area, including the temporary staging area and the utility trench areas would be seeded upon project completion. All hazardous materials used during construction would be handled and disposed of in accordance with Cannon AFB policies and protocols and all applicable state and federal regulations. The proposed aboveground storage tank would comply with all federal, state, and Cannon AFB spill control requirements, including a leak detection system, overfill alarm, and double-wall and/or secondary containment as specified in 40 CFR 112. Efforts will be made to avoid the hazardous waste site north of Site 2 and west of Site 4. Traffic management measures would be developed to facilitate traffic flow and pedestrian access as construction vehicles cross through the traveled portions of the base. Additionally, due to the potential for RFR hazards at close distance during operation of the ASR-11, warning signs indicating the safe distance from the operating radar would be installed at the facility perimeter.

6.0 REQUIRED PERMITS AND LICENSES

Environmental permitting requirements for all work on base are coordinated through the Environmental Flight, the office overseeing environmental issues at Cannon AFB. The base is operating under a synthetic minor permit from the New Mexico Environment Department, Air Quality Bureau, which would be applicable for both the construction and operation of the DASR facility. The 1,000-gallon aboveground storage tank accompanying the ASR-11 would not require pre-approval from the state and, since the generator would be used fewer than 500 hours per year, no notification of its installation to the state would be required. The number of hours the emergency generator is used would be documented by Cannon AFB.

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8.0 LIST OF PREPARERS

Metcalf & Eddy prepared this document to fulfill the requirements of the National Environmental Policy Act (NEPA) for the proposed action of constructing a DASR facility at Cannon AFB New Mexico. Other entities who provided information on an as-needed basis included Cannon AFB Environmental Management personnel (including hired contractors) and various technical personnel at URS Corporation. The following persons authored and provided direct oversight for the preparation of this environmental assessment:

MANAGEMENT

Charles Freeman, ESC/GAA. B.S. in Biology; Master of Landscape Architecture; registered Landscape Architect, Commonwealth of Massachusetts. Oasis Systems Inc. As the environmental coordination lead for the DASR program site survey, provided technical review and oversight for preparation of the environmental assessment and acted as liaison among hired contractors.

Shreve-Gibb, Betsy. M.R.P. Urban and Regional Planner. M&E. As Senior Project Manager responsible for all NEPA compliance on National Airspace System (NAS) projects, with extensive experience preparing environmental assessments and permits, provided technical review and oversight for preparation of all sections of the environmental assessment.

TASK LEADER/PRIMARY AUTHOR

Hoffman, Christina. B.S. Plant Science, Chemistry. M&E. As a Senior Environmental Scientist with extensive experience with inland wetlands and preparing technical and scientific sections of environmental permitting documents, focusing on compliance with the NEPA, provided the lead role in data collection and authored portions and reviewed all sections of the environmental assessment.

CONTRIBUTING AUTHORS

Petras, James. B.S. Biology. M&E. As a Project Scientist with diverse experience in preparing environmental assessments and impact reports for federal, municipal, and commercial entities, provided review of the environmental assessment.

Weieneth, Aaron. B.A. Environmental Science; M.S. Geography. M&E. As a Senior Environmental Planner with broad experience in urban planning and policy, GIS, the preparation of technical and scientific documents, and the implementation of environmental protection measures, provided oversight of the preparation of maps and figures for the environmental assessment, and authored portions of the environmental assessment.

APPENDIX A: LISTING OF AGENCIES AND INDIVIDUALS CONTACTED AND CORRESPONDENCE

LISTING OF AGENCIES AND INDIVIDUALS CONTACTED

Elmo Baca, New Mexico Dept of Cultural Affairs, Historic Preservation Division
Roger Berry, Cannon AFB, 27 CES/CEVP
Daniel Cass, Cannon AFB, 27 CES/CECP
Richard Chandler, Cannon AFB, 27 CES/CEVR
Dave Davis, Cannon AFB, 27 CES/CEVN
Heather Galan, Cannon AFB, 27 CS/SCMA
Henry Kostzuta, Apache Tribe of Oklahoma
Michael Rierson, Cannon AFB, 27 CES/CEVR
John Santee, Cannon AFB, 27 CES/CECP
Johnny C. Wauqua, Comanche Indian Tribe
Don White, Cannon AFB, 27 CES/CEV
Rebecca Winkler, Cannon AFB, 27 Public Affairs Office
Earl Yeahquo, Kiowa Tribe of Oklahoma
Phillip Young, New Mexico Dept of Cultural Affairs, Historic Preservation Division
Peter Zamie, Cannon AFB, 27 CES/CEVC

APPENDIX B: PRELIMINARY SITE SCREENING CRITERIA FOR CANNON AFB

PRELIMINARY SITE SCREENING CRITERIA FOR CANNON AFB

EXCLUSIONARY CRITERIA

These criteria consider the essential environmental, constructional, and operational constraints that could eliminate a site from further consideration as a potential site for the ASR-11 System. These criteria relate to environmental parameters that could lead to unmitigable significant impacts and physical parameters regarding a site's suitability for construction.
Shaded columns identify the sites that have been selected as the three alternative sites.

E	Criteria	Site 1	Site 2	Site 3	Site 4	Site 5	Site 6	Site 7
E1	Impacts occupied existing structures	No	No	No	No	No	No	No
E2	Within railroad ROW	No	No	No	No	No	No	No
E3	Within highway ROW	No	No	No	No	No	No	No
E4	Within runways and/or taxiways	No	No	No	No	No	No	No
E5	Within power line ROW	No	No	No	No	No	No	No
E6	Impacts wilderness areas	No	No	No	No	No	No	No
E7	Impacts national natural landmarks	No	No	No	No	No	No	No
E8	Site less than 160 by 160 feet	No	No	No	No	No	No	No
E9	Lacks coverage of departing aircraft within 1 nmi of the exiting runway ends	No	No	No	No	No	No	No
E10	Lacks coverage of aircraft targets on final approach up to the missed approach point	Yes[1]	No	No	No	Yes[2]	No	Yes[3]
E11	Within 1,500 feet of any non-removable above ground screening/reflecting object	No	No	No	No	No	No	No
E12	Airport specific exclusions	No	No	No	No	No	No	No

No = Meets Criteria
Yes = Does Not Meet Criteria

[1] Site 1 departing aircraft not detected from 0.1 nmi from Runway 22 threshold due to minimum detection range.
[2] Site 5 departing aircraft not detected from 0.3 nmi from Runway 31 threshold due to minimum detection range.
[3] Site 7 departing aircraft not detected from 0.5 nmi from Runway 13 threshold and 0.4 nmi from Runway 04 threshold due to minimum detection range.

Source: U.S. Air Force, 2003a

RESTRICTIVE SCREENING CRITERIA

These criteria could eliminate a site from further consideration due to the extensive mitigation required to offset potentially significant impacts. Many of these criteria originate from Federal law. In these cases, the law has been noted. Additionally, many of the criteria are covered by state and local laws, which were consulted as appropriate.

R	Criteria	Site 1	Site 2	Site 3	Site 4	Site 5	Site 6	Site 7
R1	Ecological or wildlife refuges	5	5	5	5	5	5	5
R2	Wild and scenic rivers	5	5	5	5	5	5	5
R3	Prime and unique farmland	5	5	5	5	5	5	5
R4	Parks and recreation areas	5	5	5	5	5	5	5
R5	Historical, archeological, and cultural sensitive sites	5	5	5	5	5	5	5
R6	Wetlands	5	5	5	5	5	5	5
R7	Endangered and threatened species habitat	5	5	5	5	5	5	5
R8	Non-airfield or non-federal land	5	5	5	5	5	5	5
R9	Designated unremediated hazardous waste site	5[1]	5	5	5	5[1]	5	5
R10	Capped land fill	5	5	5	5	5	5	5
R11	Scenic highways	5	5	5	5	5	5	5
R12	Coastal zones	5	5	5	5	5	5	5
R13	Steep terrain	5	5	5	5	5	5	5
R14	Floodplain	5	5	5	5	5	5	5
R15	Within 2,500 feet of existing electronic facilities or high tension power lines	5	5[2]	5[2]	5	5	5[2]	5
R16	Cone of silence impacts coverage of radar/instrument approaches, navigational fixes, airway/route, and special air traffic coverage requirements	5	5	5	5	5	5	5
R17	Within 2,500 feet of industrial operations that could interrupt or contaminate the site	5	5	5	5	5	5	5
R18	Within 0.5 nmi of ends of any operational runways and approach and departure paths	5[3]	5	5	5	5[3]	5	5[3]
R19	Violates FAR Part 77 requirements	5	5	5	5	5	5	5

Shaded columns identify the sites that have been selected as the three alternative sites.

5 = No Adverse Impacts/Meets Criteria

3 = Partially Impacted/Marginal

1 = Significantly Impacted/Does Not Meet Criteria

[1] Sites 1 and 5 are located in close proximity to a known Installation Restoration Program (IRP) site. The state is currently reviewing the base IRP/SWMU report. The base anticipates no further action will be required for these sites.

[2] Site 2 is approximately 1,300 feet from the existing GPN-20. Site 3 is approximately 1,050 feet from the existing GPN-20. Site 6 is approximately 500 feet from the transmitter site.

[3] Runway 22 end is within 0.5 nmi of Site 1. Runway 31 end is within 0.5 nmi of Site 5. Runway ends 10 and 04 are within 0.5 nmi of Site 7.

Source: U.S. Air Force, 2003a

SELECTIVE SCREENING CRITERIA

These criteria provide positive or negative considerations that will form the basis for comparison of candidate sites. Much of the information required is obtained/confirmed during site visits.

S	Criteria	Site 1	Site 2	Site 3	Site 4	Site 5	Site 6	Site 7
S1	Visual sensitivity	+	+	+	0[1]	+	+	+
S2	Accessibility to roads	+	+[2]	+	+	+	+	+
S3	Soils	+	+	+	+	+	+	+
S4	Geology	+	+	+	+	+	+	+
S5	Proximity to power	+	+	+	-[3]	+	+	+
S6	Proximity to telephone lines	+	+	+	-[4]	+	+	+
S7	Zoning	+	+	+	+	+	+	+
S8	Subsurface rights	+	+	+	+	+	+	+
S9	Unique habitat	+	+	+	+	+	+	+
S10	Utilities	+	+	+	+	+	+	+
S11	Planned use of site	+	+	+	+	+	+	+
S12	Roadways	+	+	+	+	+	+	+
S13	Water resources	+	+	+	+	+	+	+
S14	Recreational use	+	+	+	+[5]	+	+	+
S15	Underground cable routing	+	-[6]	+	-[6]	+	+	+
S16	LOS visibility to air traffic coverage requirements	+ 29 of 33	+ 28 of 33	+ 26 of 33	+ 27 of 33	+ 28 of 33	+ 28 of 33	+ 27 of 33
S17	Secondary radar coverage, on the surface, over the entire length of runways	+	+	+	+	+	+	+

+ = Positive

– = Negative

0 = Neutral

TBD – (To Be Determined) Data is unavailable at the present time.

[1] Site 4 is located approximately 1,200 feet west of two single family residences.

[2] An existing dirt access track of approximately 1,355 feet would provide access to Site 2.

[3] An adequate power source is located approximately 2,500 feet from Site 4.

[4] An adequate telephone source is located approximately 2,500 feet from Site 4.

[5] Site 4 is located in the immediate vicinity of a paintball recreation area on the opposite side of Afterburner Road.

[6] Sites 2 and 4 would require fiber optic cable runs of approximately 2,100 and 2,400 feet, respectively.

Source: U.S. Air Force, 2003a